

TV Transmitter 500W VHF

OTVP-3/500 MK

TV Transmitter 500W VHF OTVP-3/500MK

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3. ATV Exciter 100W VHF OTVP-3/100M

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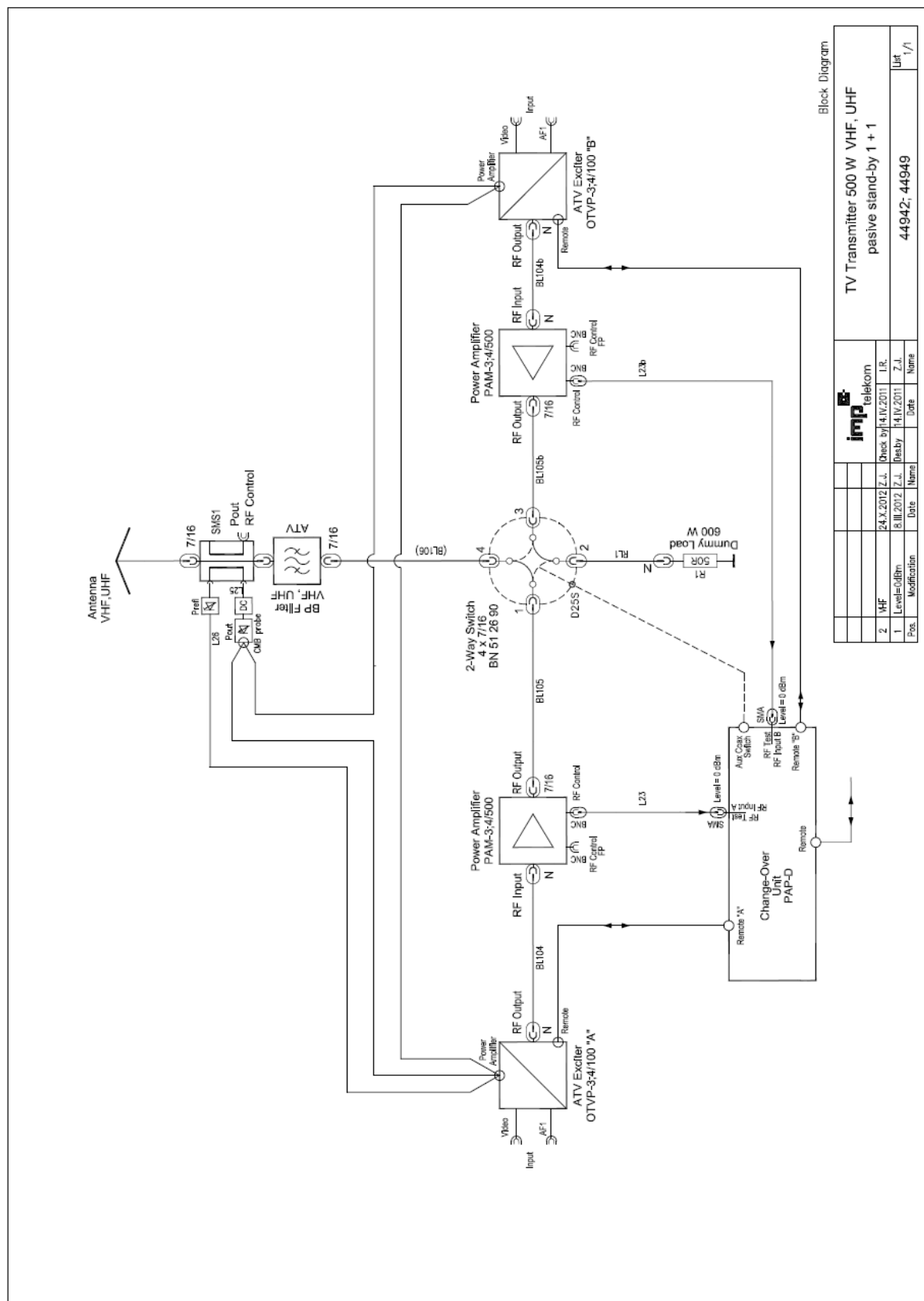
6. Change-over Automatic PAP-D

7. Attachment

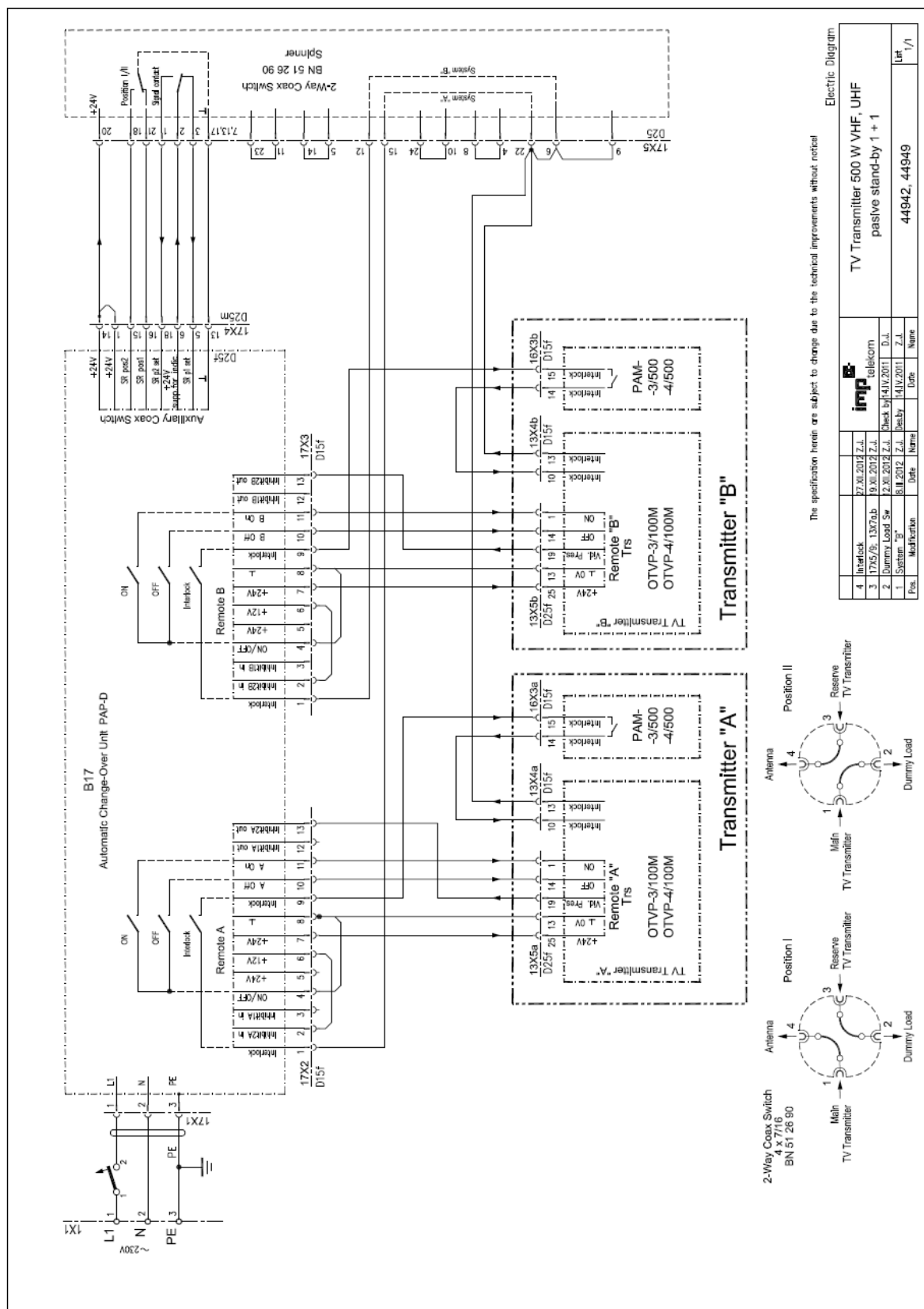
- 7.1 Declaration of conformity
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1. System 1+1

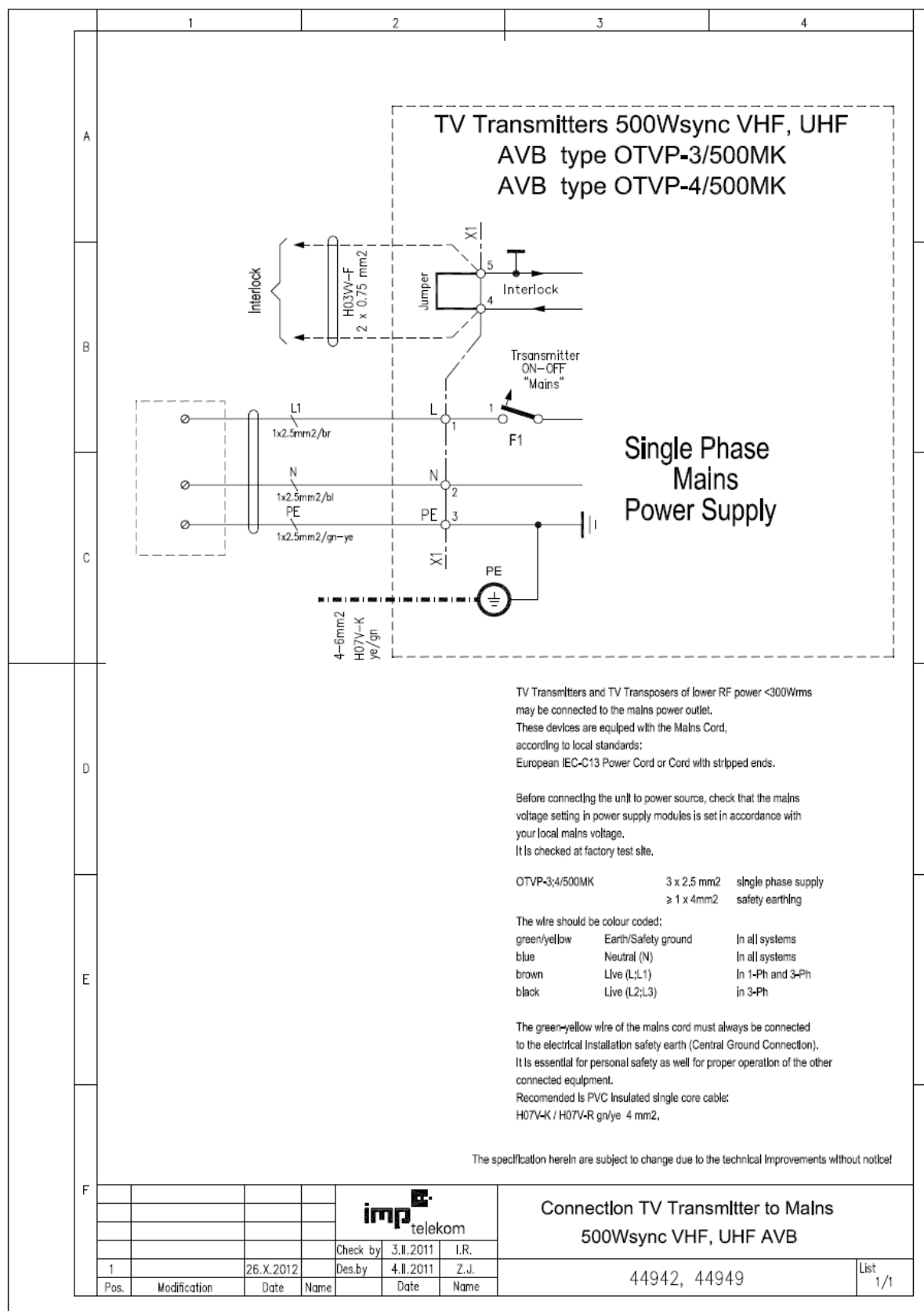
Diagram



Electrical diagram

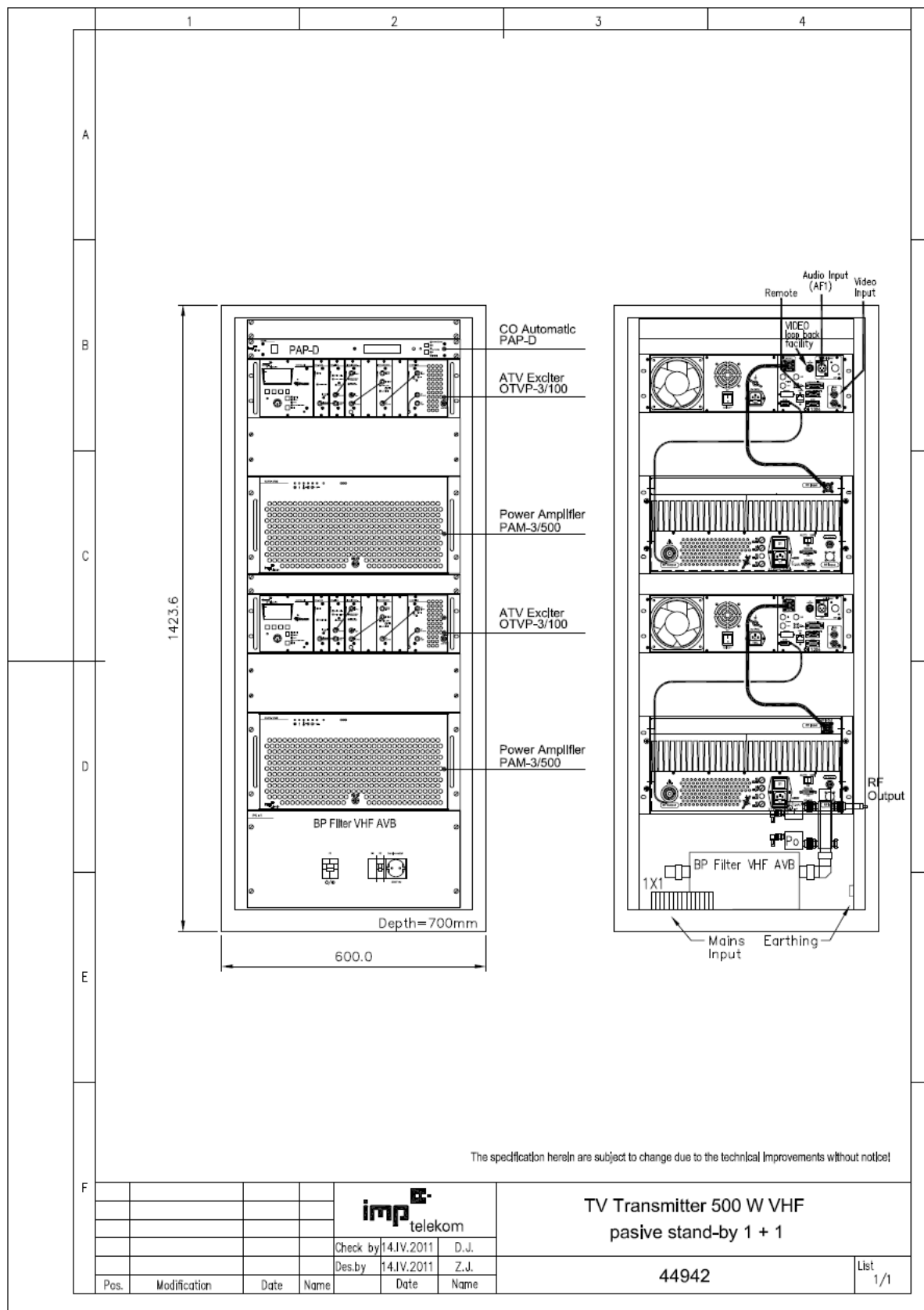


Electrical diagram for Mains connection



1.

Assembly



Designation:	Stock No:	Date:	5.11.2012
<i>TV TRANSMITTER 500W VHF OTVP-3/500MK 1+1</i>	44942		

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2. TV Transmitter 500W VHF OTVP-3/500MK configuration

TV TRANSMITTER OTVP-x/1-2000

General description:

The OTVP family of TV transmitters comprises all types of transmitters OTVP-3, OTVP-4 with output powers 0.2W, 1W, 2W, 5W, 10W, 20W, 50W, 100W and 200W. All are fully solid state. They can operate as independent transmitters, or they can be used as driver units for transmitters of higher power (500W, 1000W, 2000W).

Basic components of TV transmitters:

- Microcontroller
- Sound modulator
- Vision modulator
- IF corrector
- IF/RF converter with local oscillator
- RF amplifying stages 1, 2, 5, 10, 20, 50, 100W, 200W with additional racks up to 2000W.
- RF bandpass filter (only in independent transmitters)
- Directional coupler
- Power supply

Some important features of individual subunits:

- all RF amplifying stages are of broadband type;
- all RF amplifying stages are in the absence of reception signal turned OFF (except in the case of manual start-up);
- local oscillator is PLL synthesiser type;
- most of subunits are plug-in modular units which can be easily replaced from the front or rear side;
- all control elements are easily accessible;
- the unit is air-cooled, and the fan is incorporated in the rear of the rack.
- the functions of TV transmitter are controlled by a microcontroller;
- settings, controls and measurements are shown on a graphics display 128 x 64 on the front side of the transmitter;
- all data and settings can be transferred to, or input by means of a PC through RS232 interface.

Description of operation:

MICROCONTROLLER MCE OTVP

Microcontroller part of transmitter consists of two units. MCU-OTVP is central processor unit which takes care of all data important for operating of the transmitter. DISPLAY – OTVP is user interface for control and display status of the transmitter.

It is used to control operation of exciter and entire transmitter, measuring parameters and logging events. Firmware is stored in flash memory and can be easily upgraded through RS-232 interface on the rear side of panel of exciter, which enables connection of PC computer or modem to the transmitter for remote monitoring and controlling. RS485 serial port is used to control the PA modules of transmitter and possible other control devices. Remote module is included to indicate and control basic state of transmitter operation according to the IEC 864-1 specifications. Optional Web-interface can be included which intercepts data from RS232 and generates web-page based on current transmitter parameters. It uses Ethernet connection to the LAN network.

There are also LEDs for the following information:

- transmitter on/off
- transmitter state ON/OFF/AUTO/REMOTE
- VIDEO 1,2 present
- fault

MODULATOR VISION MVP

The MODULATOR VISION MVP is an amplitude modulator of IF video carrier (VC) with video signal. The unit complies with technical standards ITU-R BT 472. It can be built according to either PAL or SECAM standards.

Video modulator MVP consists of following subunits:

- a) Video input level control: auto or manual. Auto mode is possible only when the line 17 (or 18) is present..
- b) Sinchro pulse regeneration
- c) White level limiter
- d) Group delay precorrection
- e) DC black level restoration and modulation depth setting
- f) Amplitude modulator
- g) Oscillator 38.9 MHz with external frequency reference
- h) SAW filter
- i) IF amplifier with level control

Subunits are controlled by Microcontroller Unit where the basic settings and measurements are available.

On the front plate are led diodes which signallised:

	Green	Red	Orange – yellow
White limiter	ON	OFF	White level exceeded
Input level regulation	Auto mode	Manual mode	Line 17/18 not present
Sinchro regenerator	ON	OFF	Fault

MODULATOR SOUND MSP – M or S

Symmetrical sound input AF1 arrives into the module via the connector X1:C2,C3. By means of potentiometer P2 on the front panel, the gain of AF input signal is set and, consequently, the depth of FM - SC1 deviation. The level of input audio signal is displayed by the master control unit (MCU), in menu 2.Measurement. The display of AF Level = 0dB corresponds to 30kHz of SC1 deviation. Then follows the circuitry of preemphasis amplifier and deviation limiter. The sound signal causes frequency modulation of LC oscillator (T4). The output frequency is PLL synchronised by the oscillator of the video modulator. The input of oscillator signal is on connector X1:6 (38.9 MHz).

SC1 amplitude is adjustable by means of potentiometer P1 (on front panel) and is stabilised by means of automatic gain control circuitry (AGC).

The operation of the module is supervised and controlled by MCU through 12C communication (SCL, SDA). Preemphasis circuitry and SC1 can be switched ON/OFF. The status is indication by corresponding LEDs on the front panel. Green LED indicates ON status, and red OFF status. The module supervises the operation of PLL and the level of IF carrier. MCU will display error messages: Sound Carrier PLL Unlock, and IF Sound Level LOW. In the case of IF Sound Level LOW, the green LED will go off (Sound Carrier).

IF CORRECTOR KL-MC or KL-HL

This module works together with RF converter IRCD-AVB. The purpose of the corrector is to ensure compensation of non-linearity of output power amplifying stages. For output power up to 200W, a corrector KL-MC is used, for greater power is used corrector KL-HL.

RF CONVERTER IRCD-AVB

The module RF Converter IRCD-AVB comprises three subunits:

- RF converter

RF converter, that translates the incoming IF signal from AVB modulator to output RF channel with spectral inversion. An input signal is converted to the output frequency in range between 40 and 860 MHz.

- Local oscillator

Direct digital synthesis is used in carrier frequency synthesizer. Carrier frequency is set in 1 Hz step by microcontroller using frequency selecting menu. Precision of the output frequency is possible to control either with internal or external reference frequency.

- ALC circuitry

The circuitry ensures the possibility of manual and automatic gain control of the module (depend on the selected type of control operation – (AUTO/MAN = ...)). If pin 4 (AUTO/MAN) of the connector has a low logical level, the module will operate automatically.

OUTPUT STAGE RFA-302

Amplifier RFA-302 is designed to work in the entire band 170-230 MHz with relevant power level. It consist of VHF linear pallet amplifier class AB, which is installed on a heat sink.

2.

RF amplifier amplify an relatively low input RF signal. Amplified RF signal is led to the next amplifying stage A3100. Has a built-in over temperature protection.

OUTPUT STAGE RFA-410 or RFA-402D

It consist of hybrid amplifier which ensures input matching and amplify relatively low input RF signal. Amplified RF signal is led to the driver stage.

The driver consists of the driver transistor and quiescent current stabiliser (bias).

From the driver, the signal is led throught –3dB 90deg directional coupler and applied to the input of the output stage and quiescent current stabiliser (bias). The amplified output signal is led through –3dB 90deg directional coupler and output metering directional coupler and applied to the output connector RF OUT (type SMA).

POWER STAGE A-4100

For the power stage 20W , 50W and 100W is used amplifier cassette MK-4/250. Is a solid state broadband UHF amplifier class AB. It consists of RF part, with the transistor BLF861A serving as the basic amplifying unit and power supply. The transistor BLF861A is dual push/pull LD MOS transistor manufactured by NXP.

POWER STAGE A-3100

For the power stage 20W , 50W and 100W is used amplifier cassette NIO-3/200. The amplifier cassette **NIO-3/200** is a solid state broadband VHF amplifier class AB. It consists of RF part, with the transistor BLF248 as the basic amplifying element, and of power supply. The transistor BLF248 is dual push/pull MOSFET transistor manufactured by NXP.

Processor module supervises and controls the operation of TV transmitter by means of a program, which either provides factory-set parameters or includes settings entered by the user via keyboard and display.

When starting the transmitter the processor will start the process of controlling individual stages with regard to input signal level and operating mode. After the system has been equilibrated, power amplifying stages will be started.

In the event of failure of supply or mains voltage, the most recent settings will be kept stored in memory. When restarting the system, the transmitter will automatically return to the most recent status.

THE MCE MODULE COMPRISES:

- 8 bit microcontroller,
- AD converters,
- DA converters,
- storage unit,
- real time clock,
- four-line LCD,
- encoder wheel and control keys.

Basic data shown on the display:

- transmitter type,

- output channel,
- operating mode: AUTO/REMOTE/MAN,
- Settings of:
 - sound modulator,
 - video modulator,
 - linearity corrector ,
 - output power,
- Measurements:
 - supply voltages,
 - currents of modules,
 - output power levels,
 - reflected power
 - temperature of power amplifying stage,
 - video level,
 - audio input level,
 - oscillator voltage
 - oscilator chanel and offset
- Error signalling:
 - exceeding of limit values (currents, temperatures), main power suply
- Date and time.

In the event of occurrence of a fault (for example, excessive temperature), a red LED will be lit on the front panel, and the cause for the fault will be written on the display. Urgent status information, including the date of the event concerned, will be stored in special memory, from which it can be transferred via RS232 interface (located on the rear side of the housing) into the computer or modem. For the purpose of controlling the operation of the transmitter, to change the settings or to monitor transmitter operation, a PC connected to RS232 interface can be used.

The REMOTE connector at the rear of the transmitter can be used for remote-controlled starting or stopping of the final amplifying stages of the transmitter.

MECHANICAL DESIGN

TV transmitter is incorporated in a standard 19'' rack with height 3RU (133mm). TV transmitters are available in desktop housing or in a standard 19'' rack for installation into 19'' cabinets. For powers greater then 200W, an additional stage is used (Power Amplifier KSMC-4/500, PAM-4/300).

MAINTENANCE

Special maintenance for the Transmitters serie OTVP is not necessary. Checking the fans and eventually cleaning the dust once per year is recommended.

GENERAL TECHNICAL CHARACTERISTICS OF TV

TRANSMITTERS

Series OTVP - 4/XX (OTVP - 3/XX)

Series OTVP transmitters are manufactured in compliance with ITU/R recommendations No.624-2 and B/G PAL standard.

1. RF characteristics

1.1. Frequency range : OTVP -4 /XX OTVP – 3/XX	470 to 860 MH 174 to 230 MHz
1.2. Output power (W)	1, 2, 5, 10, 20, 50, 100 200, 500, 1000, 2000
1.3. Vision/sound amplification	common
1.4. Vision/sound power ratio	1/10 mono 1/13, 1/20 stereo
1.5. TV standard	B, G (D, K on request) (PAL-625 lines, ITU-R Standard-B for VHF) (PAL-625 lines, ITU-R Standard-G for UHF)
1.6. Type of emission	vision C3F negative AM with colour PAL-B/G sound F3E (F3)
1.7. Longterm frequency stability: no offset	±150 Hz/3 months
1.8. Sound FM carrier deviation	±30 kHz nominal (±50 kHz on request)

2. Video characteristics

2.1. Video input connector	BNC , 75Ω; one for analog with loop back facility in Exciter
2.2. Nominal input level	sync 0.3V ± 6 dB, video 0.7V
2.3. Input impedance	75 Ω unbalance (BNC)
2.4. Return loss	≥ 30 dB (0 - 5.5 MHz)
2.5 Waveform response	Tilt, 50 Hz 2% 15 kHz 2% 2T pulse amplitude 2%

2.6 Non Linear Distortion at 4.43 MHz

Differential gain	5%
Differential phase	3°

2.7 Video Noise (100 kHz to 5 MHz)

unweighted (0.2 to 5 MHz)	56 dB
weighted	63 dB
Hum, peak voltage up to 1kHz	46 dB

3. Audio characteristics

3.1. Nominal input level	+ 16dBv - 14dBv (600 Ω)
3.2. Input impedance (selective)	600 Ω / 12 k Ω balanced
3.3. Pre-emphasis	50 μ s

4. General performance

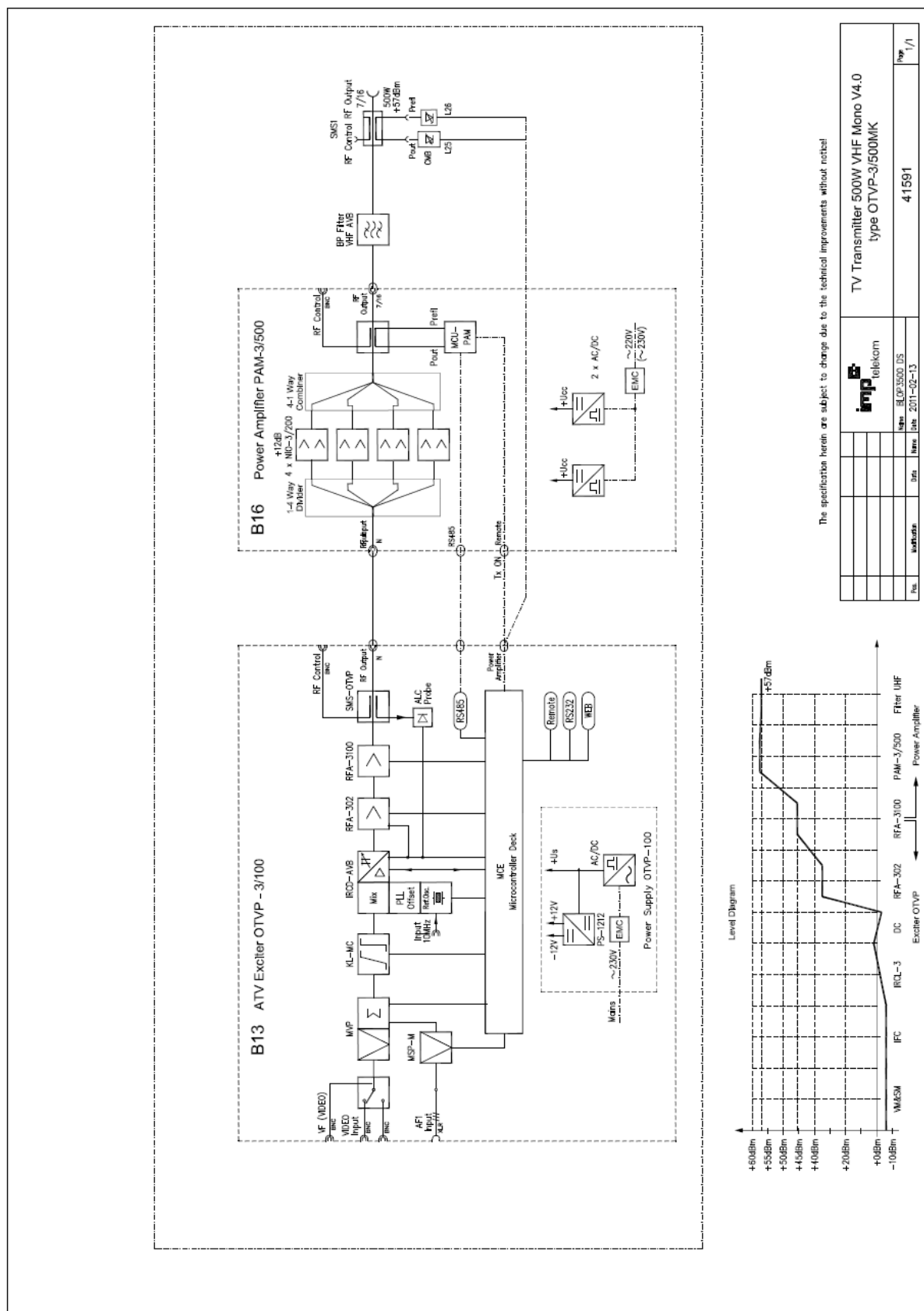
4.1. Output Connector	female type "N"(up to 200W) 7/16, another type on request
4.2. Output Impedance	50 Ω asymmetrical
4.3. Harmonic level	60 dB below carrier level
4.4. Spurious emission	60 dB below carrier level
4.5. RF Control	1V _{eff} - RF connector BNC, SMA
4.6. Operating temperature range	-0°C .. +45°C
4.7. Storage temperature	-20°C .. +60°C
4.8. Relative humidity	95 %
4.9. Altitude	up to 2500 m above sea level, consult factory for other altitudes
4.10. Power Supply voltage	230V(220V) AC, single phase (1P)

P_o [W]	TYPE		Power consumption* [W]		Weight [kg]	Dimensions W x H x D [mm]
	VHF	UHF	VHF	UHF		
1	OTVP-3/1	OTVP-4/1	145	120	20	482 x 133 x 560
2	OTVP-3/2	OTVP-4/2	145	120	20	482 x 133 x 560
5	OTVP-3/5	OTVP-4/5	145	200	25	482 x 133 x 560
10	OTVP-3/10	OTVP-4/10	170	250	25	482 x 133 x 560
20	OTVP-3/20	OTVP-4/20	230	260	25	482 x 133 x 560
50	OTVP-3/50	OTVP-4/50	310/240 ; 310/240		25	482 x 133 x 560
100	OTVP-3/100	OTVP-4/100	400/310 ; 400/300		25	482 x 133 x 560
200	OTVP-3/200	OTVP-4/200	740/580 ; 800/550		80	546 x 510 x 610
500	OTVP-3/500	OTVP-4/500	1500/880 ; 1600/1050		280	536 x 735 x 736
1000	OTVP-3/1000	OTVP-4/1000	2700/1700 ; 2800/1800		310	600 x 1425 x 700
2000	OTVP-3/2000	OTVP-4/2000	5600/3700		380	620 x 1862 x 1200

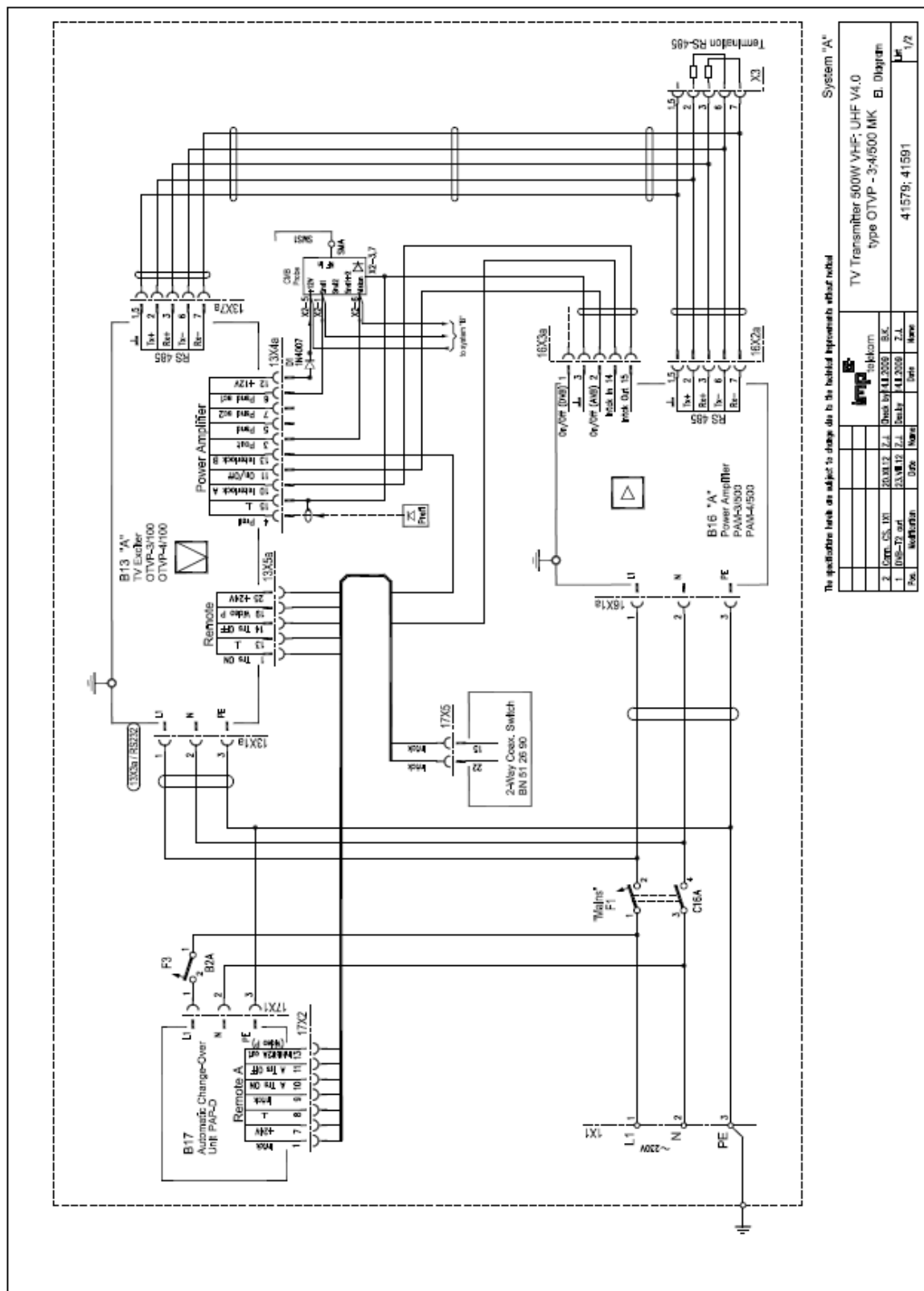
(Rmk.: black/white)

* Power Consumption depends on channel!

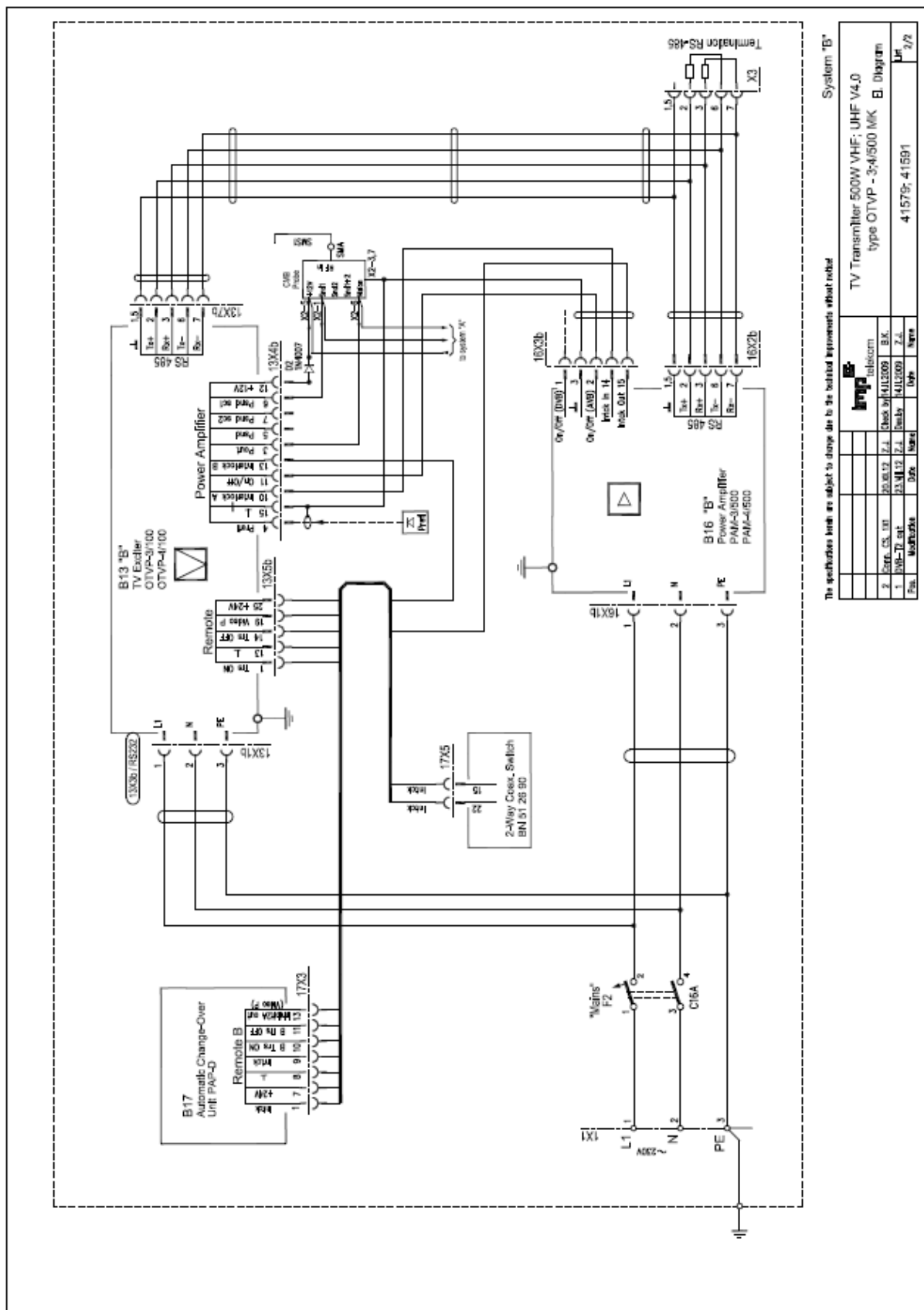
Block diagram



Electrical diagram (page 1/2)



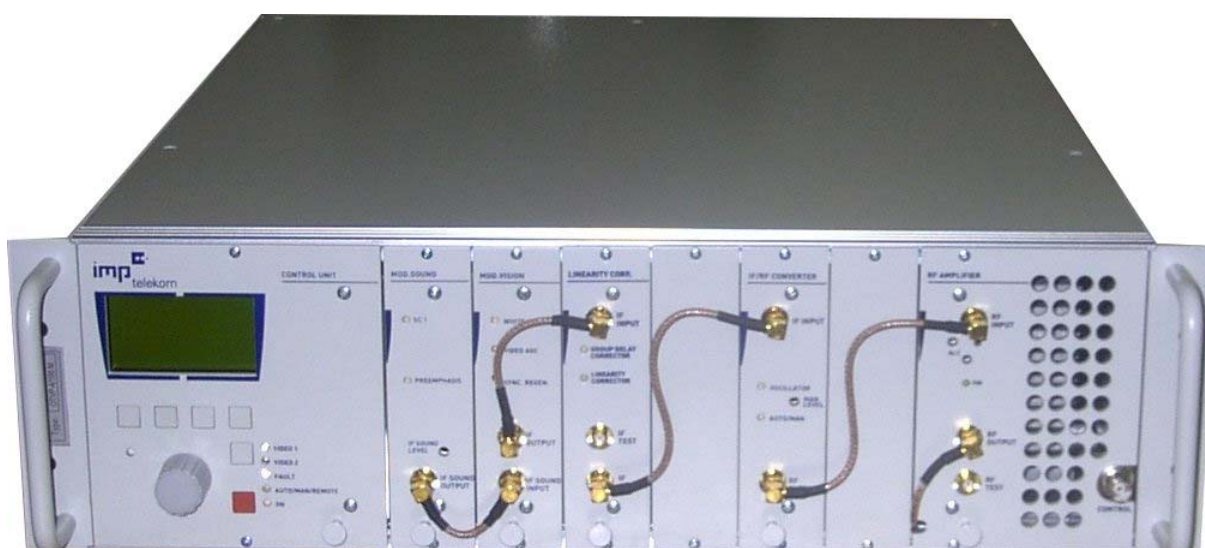
Electrical diagram (page 2/2)



Designation:	Stock No:	Date:	10.10.2011
<i>TV TRANSMITTER 500W VHF OTVP-3/500MK V4</i>	41591		

3.

3. ATV Exciter 100W VHF OTVP-3/100M



The block diagram illustrates the architecture of the TV Transmitter 100W VHF Mono V4.1. The system is centered around a Microcontroller MCE (Block 1) which manages various functions including VIDEO 1, VIDEO 2, MIED 2, FAULT, A/N/R, and ON/OFF. The signal flow starts with VIDEO and AUDIO inputs (Block 19) which pass through a Ramp/Video Control block. The video signal then goes through a VHS-M Sound Modulator (Block 2) and a Linearly Converter (Block 4) before entering the IF/AF Converter (Block 6). The audio signal is processed by an ALC SRS (Block 3) and a PLS (Block 10). The IF/AF Converter (Block 6) includes a Mixer (Mx1), a VCO, and a VCO Dec2. The output of the IF/AF Converter is then amplified by two RF Amplifier UHF blocks (Block 8 and Block 9) before reaching the final RF Output (Block 14). The power supply (Block 15) provides the necessary voltages for the system, including +12V, +1.2V, and +5V. A level diagram on the right shows the signal level in dBm across different stages: VM&SW (-10dBm), KL-MC (-40dBm), IRCD-AB (-20dBm), RFA-302 (+20dBm), and RFA-3100 (+50dBm).

Pos.	Modification	Date	Name	Check by	U.C.	Draw by	Date	Form	Int.

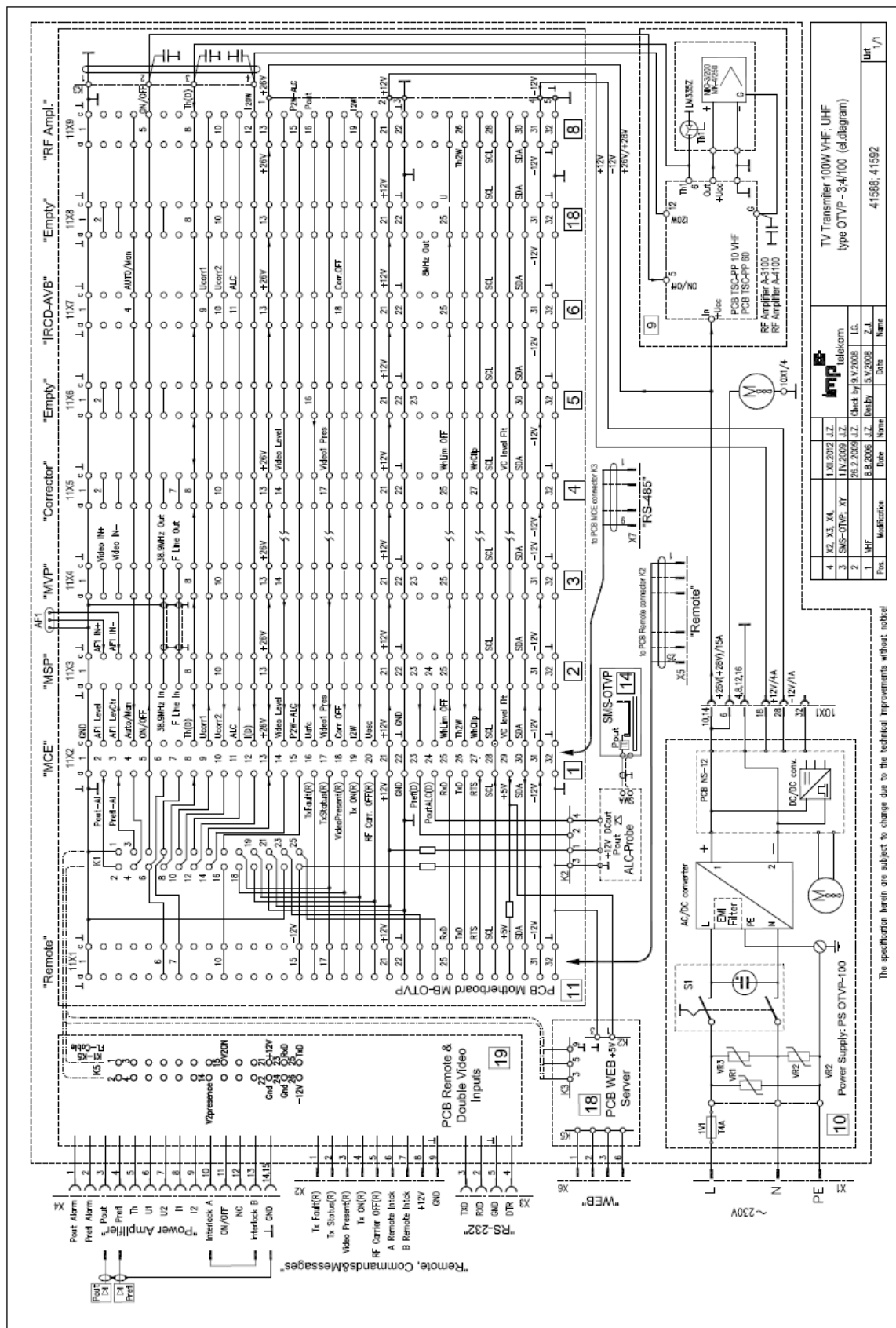
imp
telekom

Check by 11.11.2009 U.C.
Draw by 11.11.2009 Z.J.

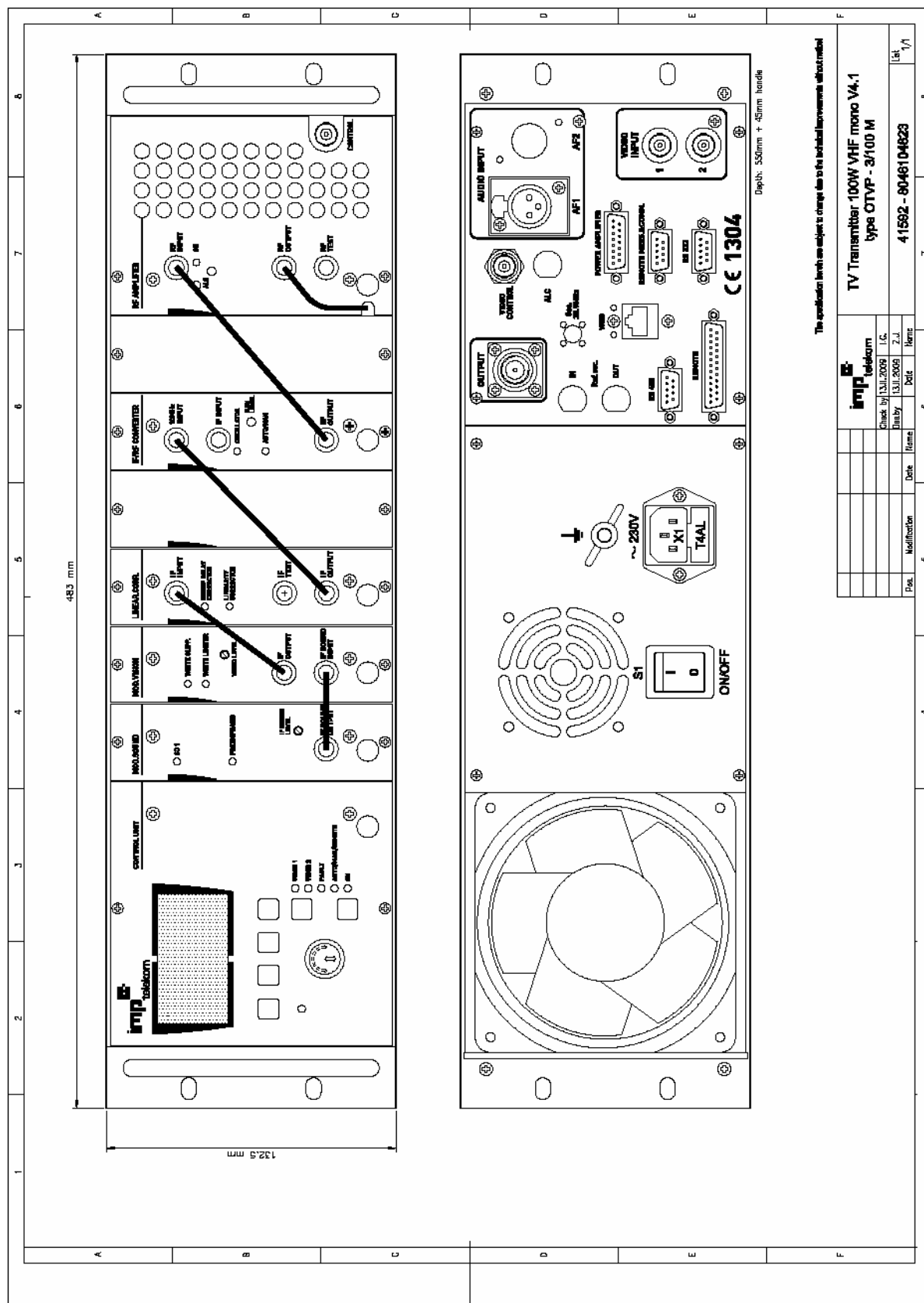
TV Transmitter 100W VHF Mono V4.1
type OTVP - 3Y100 M
4-1592 - 804-6104832

The specification herein are subject to change due to the technical improvements without notice.

Electrical diagram



Assembly

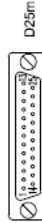


Description of connectors

Connector X5 (Remote)

Pin Assignments:

Pin	Direct.	Abbrev.	Function:	Remark:
1	o →	ON	Trs Switch-On	Command
2	o →	MOON	Switch to Mono	Command
3	o →	RESET	RESET	Command
4	o →	ONS	Transmitter ON	Signalisation
5	o →	STONS	Stereo On	Signalisation
6	o →	PVAL-S	Pval-S alarm < 3dB	Signalisation
7	o →	PVSAL-S	Pvsal v+s alarm < 3dB	Signalisation
8	o →	PV-A	PVision	Analog A1
9	o →	PVSA	PVision+sound	Analog A2
10	o	/	/	Not used
11	o	/	/	Not used
12	o	/	/	Not used
13	o	0VGL	⊥ GND g.s.	0V galv.sep.
14	o →	OFF	Trs Switch-Off	Command
15	o →	STON	Switch to Stereo	Command
16	o →	LOK-S	Local	Signalisation
17	o →	FAU-S	Fault (Th.Prefl...)	Signalisation
18	o →	PSAL-S	Psound-alarm	Signalisation
19	o →	VID-S	VIDEO Presence	Signalisation
20	o →	MAINS	MAINS Presence	Signalisation
21	o →	PS-A	Psound	Analog A3
22	o	AGND	Analog Ground	AGnd
23	o	/	/	Not used
24	o	/	/	Not used
25	o →	+24GL	Power Supply +24V g.s.	+24V galv.sep.

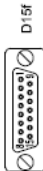


D25m

Connector X4 (Power Amplifier X1 on PCB)

Pin Assignments:

Pin	Direct.	Function:	Remark:
1	o →	Pout-Alarm	Report
2	o →	Prefl-Alarm	Report
3	o →	Pout	Report
4	o →	Prefl	Report
5	o →	Th (Temperature)	Report
6	o →	U1	Voltage Control
7	o →	U2	Voltage Control
8	o →	I1	Current Control
9	o →	I2	Current Control
10	o →	Interlock A	
11	o →	ON/OFF	
12	o →	/ (NC)	
13	o →	Interlock B	
14	o →	⊥	0V
15	o →	⊥	0V



D15f

Connector X7 (Bus RS-485)

Pin Assignments:

Pin	Direct.	Function:	Remark:
2	o →	Tx+	
3	o →	Rx+	
6	o →	Tx-	
7	o →	Rx-	
1,5	o	⊥	0V Gnd



D9m

Connector X2 (Remote Messages & Commands X2 on PCB)

Pin Assignments:

Pin	Direct.	Function:	Remark:
1	o →	Tx Fault	
2	o →	Tx Status	
3	o →	Video Present	
4	o →	Tx ON	
5	o →	RF Carrier OFF	
6	o →	Remote Interlock A	
7	o →	Remote Interlock B	
8	o →	+12V	Power Supply
9	o	⊥ GND	



D8m

Connector X3 (Bus RS-232 - X3 on PCB)

Pin Assignments:

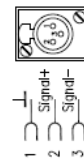
Pin	Function:	Remark:
2	RXD	
3	TXD	
4	DTR	
5	⊥	0V Gnd



D8f

Connector AF1AF2

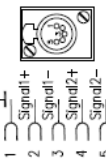
Pin Assignments:



Optional

Connector AF1AF2

Pin Assignments:



The specification herein is subject to change due to the technical improvements without notice.

imp ten-telekom				Pin Assignments of Connector type OTVP - 3/4/0.2 - 100 AVB V4.0			
2	Renumber com.	1.XI.2012 Z.L.	Check by	1.VI.2009 M.K.	Date	Name	1/1
1		20.1.2012 Z.L.	Issue by	4.VI.2009 Z.L.	Date	Name	
Pos.	Modification	Date	Name	Date	Name		
				804610...; 909200...			



RJ45

Bill of material

Designation:	Stock No:	Date:	3.10.2011
<i>ATV EXCITER 100W UHF OTVP-3/100M</i>	41592		

No IMP	Pcs	Designation	Stock No.	Signature	Rem. / Ven.
2	1	CASSETTE OTVP V2.2	33723-8026102152		IMP
4	1	MICROCONTROLLER MCE-OTVP V1.1	31762		IMP
6	1	SOUND MODULATOR MONO MSP-M V2.0	27432-803611678		IMP
8	1	VISION MODULATOR MVP V2.0	31171-803611725		IMP
10	1	CORECTOR LIN. KL-MC	31350-803611740		IMP
12	1	RF CONVERTER IRCD-AVB	34125		IMP
16	1	RF AMPLIFIER 2-5W VHF RFA-302 V3	27372-803611618		IMP
18	1	RF AMPLIFIER 100W VHF RFA-3100	27380-803611626		IMP
24	1	DIRECTIONAL COUPLER SMS OTVP/PTVP 100	33076-8026102002		IMP
26	1	POWER SUPPLY PS OTVP-100	32404-803611745		IMP
30	1	PCB REMOTE & DOUBLE VIDEO INPUT	31128-803562033		IMP
32		PCB REMOTE OTVP-EXC	32569		
34	1	PCB WEB SERVER 2 V1.1	31927		IMP
36	1	PROBE ALC-SMB	27020-803611226		IMP
38	1	FAN AXIAL 119 X 119, 24VS	23921-801610270		IMP
40		RF CONNECTIONS :	31476-801610331		IMP
	1	CABLE RF K2 ; L=80	23706-801570912	(MVP-CLIN)	IMP
	2	CABLE RF K4 ; L=100	23707-801570913	(CLIN-IRCD; IRCD-A402)	IMP
	1	CABLE RF 1 ; L=220	23623-801570828	(A402-A4100)	IMP
	1	CABLE RF 2 ; L=50	23622-801570827	(MVP-MSP)	IMP
	1	CABLE RF DIVIDER ; L=220	23579-801570783	(SMS-ALC PROBE)	IMP
	1	CABLE RF K8 (UHF) ; L=530	23631-801570836	(SMS-A4100)	IMP
	1	CABLE RF CONTROL ; L=800	23671-801570876	(SMS-RF CONTROL)	IMP
	1	CABLE RF CONTROL ; L=150	23671-801570876	(VID In RearPl-PCB VID)	IMP
	1	CABLE RF VIDEO INPUT ; L=500	18814-801570400	(PCB VID-MBOTVP)	IMP
	1	CABLE OTVL-INPUT ; L=460	23473-801570674	(A In RearPl-MBOTVP)	IMP
	1	CABLE FLAT 10P TES RES-MCU ; L=2 x 250	31053-801570971	(PCB WEB-MBOTVP)	IMP
	1	CABLE FLAT REMOTE-MCE,OTVP ; L=550	32599-801571008	(REMOTE RearPl-MCE)	IMP
	1	CABLE FLAT BUS-RS232/RS485 ; L=600	23722-801570928	(RS485 RearPl-MCE)	IMP
	1	CABLE FLAT PROBE PEFF-MBOTVP; L=380	32610-801571013	(ALC PROBE-MOTVP)	IMP
	1	CABLE FLAT A-4100 – MB OTVP ; L=320	41958-801571082	(A4100-MBOTVP)	IMP
	1	PCB JACK RJ-45, 8-PIN ; L=300	31271-802560016	(WEB RearPl-PCB WEB)	IMP

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Mikrokontroler MCE-OTVP V1.1
Microcontroller MCE-OTVP V1.1
31762

[illegible]



OTVP Microcontroller unit

User Manual

V1.1

Ljubljana, November 2008

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1. Introduction

This device is supplied by the TV Transmitters manufactured by IMP TEN-TELEKOM d.o.o. This document describes operation of OTVP microcontroller unit with firmware revision V1.5. The following types of transmitters are supported by the firmware:

- OTV 4/2 (liquid or air cooling)
- OTVP 4/1000 (air cooling)
- OTVP 4/500 (air cooling)
- OTVP 3/500 (air cooling)
- OTVP 4/100 (air cooling)
- OTVP 3/100 (air cooling)
- OTVP 4/2 (air cooling)

Functions of Microcontroller Unit:

- controlling transmitter operation (power switch, exciter, cooling system, etc.)
- monitoring of important parameters of the transmitter (output power, reflection temperature, power amplifier modules parameters, etc.)
- user interface for settings operation parameters
- alarm reporting
- storing of up to 400 events during transmitter operation
- remote control with relay contacts according to the IEC 864-1 specifications, with personal computer through RS232 port or by ethernet TCP/IP network (optional).

2. Hardware configuration

Microcontroller unit is a part of exciter. It has user interface on the front panel with graphic display for easy readings, function buttons, LED diodes and encoder wheel. On the back panel of exciter there are different connectors:

- Connectors “Transmitter control” and “Transmitter monitor” are connected to the transmitter for controlling and capturing important data of the transmitter.
- Remote connector is connected to the control room for relay-contact remote control.
- Optional RJ-45 connector for remote control through LAN network.
- RS232 connector for direct connection with the personal computer.
- RS485 connector for connection with power amplifier modules and transmitter control unit.

Front panel

Figure 1 shows layout of the front panel. The numbered positions show the following items:

- (1): graphical LCD display with resolution 128×64 pixels for displaying all the parameters of transmitter.
- (2): function buttons F1, F2, F3 and F4 can have different functions depending on status line above them on display.
- (3): system reset button, which is reachable only with the small thin stick or screwdriver.
- (4): encoder wheel, which by means of rotation allows selection or setting of displayed parameters and conformation them by pressing encoder wheel.
- (5): green LED “VIDEO 1” indicates the presence of input signal on video input 1.
- (6): green LED “VIDEO 2” indicates the presence of input signal on video input 2.
- (7): red LED “FAULT” indicates system fault.
- (8): two-colour LED “AUTO/MAN/REMOTE” indicates chosen Switch on mode. In AUTO mode it is lit green, in MAN mode it is lit red and in REMOTE mode it is flashing green.
- (9): two-colour LED “ON” is lit green when the transmitter is switched ON. If LED is flashing green, it means that some failure occurs at the start up of transmitter. Also in this case the “FAULT” LED will light red. If LED is lit red, then the output power is too low.
- (10): power button (red) for starting the transmitter in local manual mode. This button serves also as an emergency stop button in all switch modes.

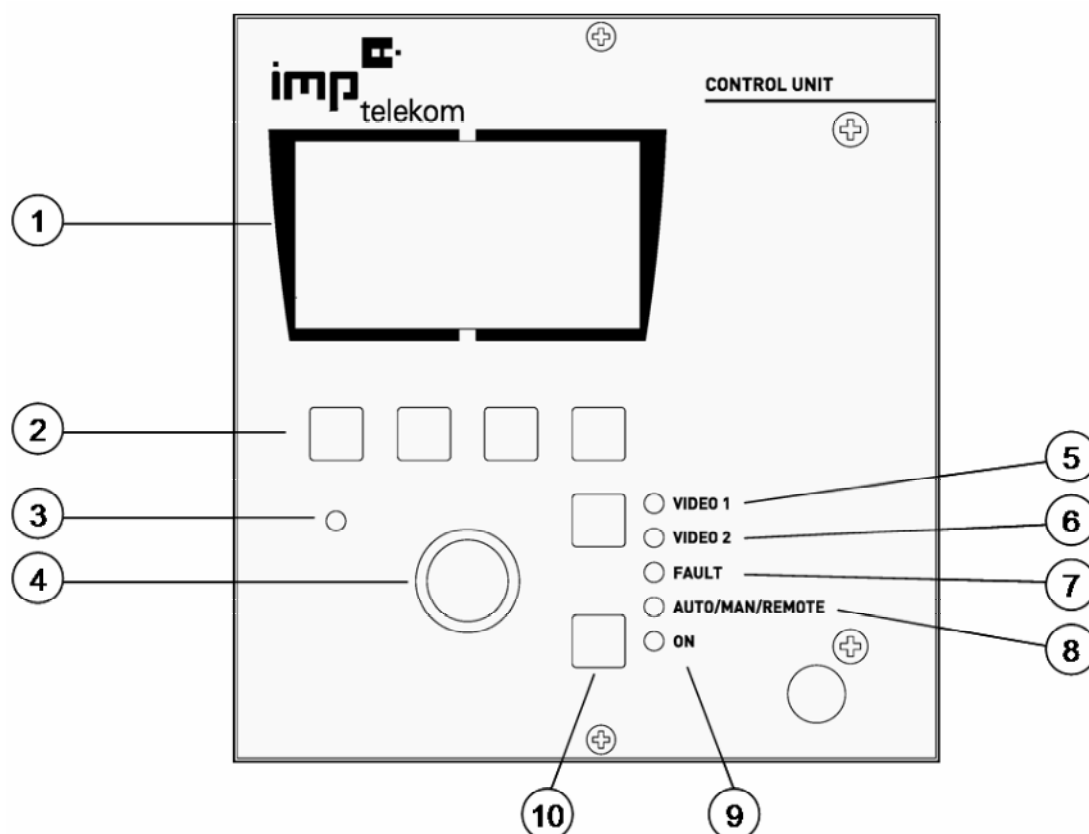


Figure 1: Front panel

3.Display description

Layout of display is shown on Figure 2. Status line (1) shows description of the current view. Function buttons line (4) describes current function of the function buttons F1 – F4. By rotating encoder wheel it is possible to access more functions accessible with function buttons. This option is shown by arrow (5) appearing on upper left or right side of display. If arrow (9) appears on either top or bottom right side of display it means that we can access more parameters by rotating encoder wheel. We can see time and date (2) of the microcontroller real time clock. On the upper right side the current power switch state (6) is shown. This side also contains information about double drive option, if selected. (7) Transmitter identification string (8) is also shown on display. The main area of display (3) shows selected measurement, settings, etc.

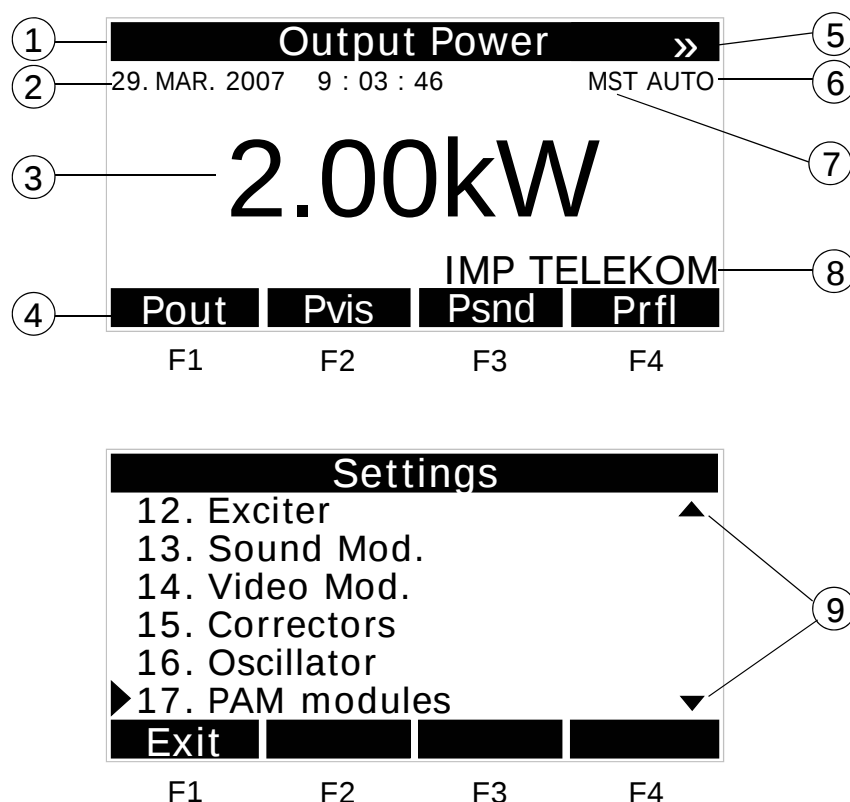


Figure 2: Display

4. Menu description

4.1 Base Metering

Base metering menu (Figure 3) displays the main parameters of transmitters. Desired metering can be selected by function buttons F1 – F4. The following parameters are shown in base metering:

- Date and time of microcontroller,
- power switch state (auto, manual, remote),
- transmitter identification string,
- Output power (F1), vision power (F2), sound power (F3), reflected power (F4). On another set of functions ambient temperature of liquid cooled transmitters is accessible (F4).

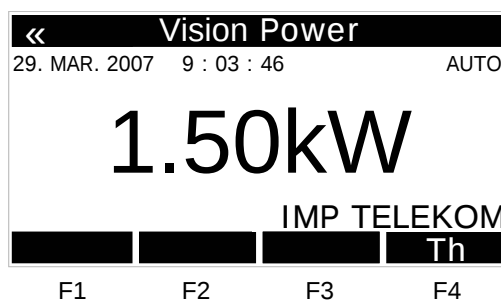
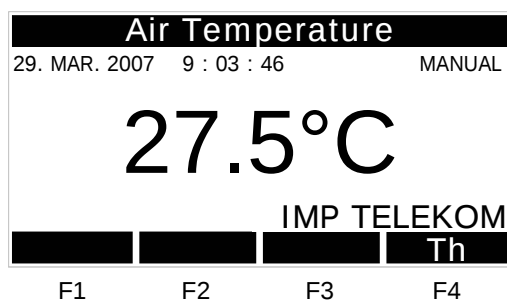
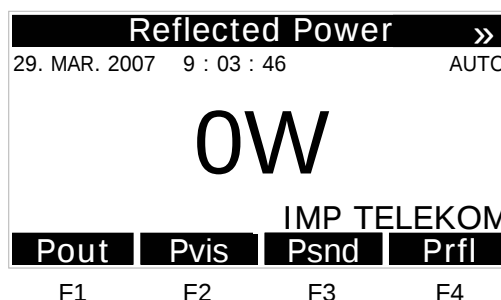
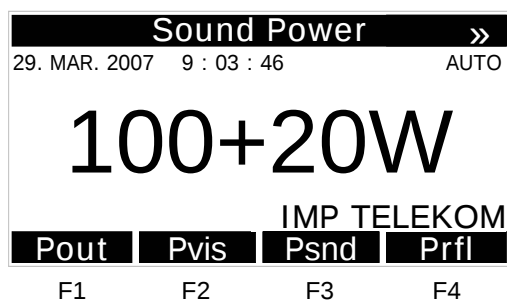
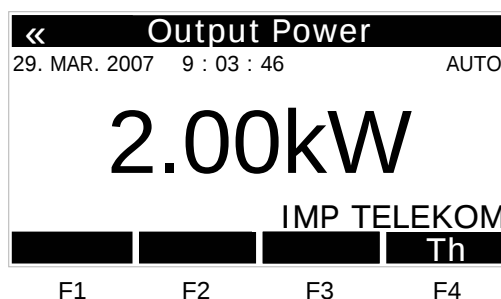
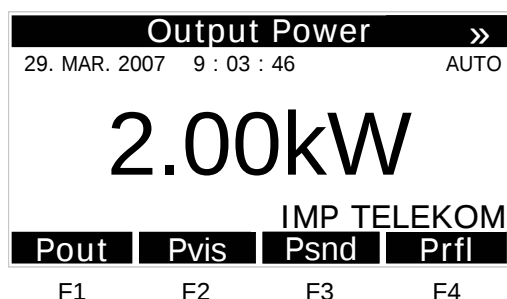


Figure 3: Base metering

4.2 Main menu

Main menu (Figure 4) can be accessed from base metering menu at any time simply by pressing the encoder wheel. There are four items that can be selected by turning the encoder wheel and confirmed by pressing it.

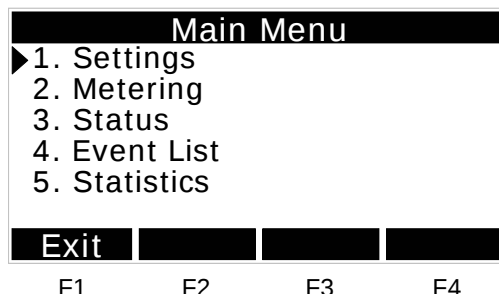


Figure 4: Main menu

The items of Main menu have following meaning:

1. **Settings** – settings of all transmitter components
2. **Metering** – presentation of particular states and values in transmitter components
3. **Status** - current operating status of transmitter
4. **Event list** - history of events during operation of transmitter
5. **Statistics** – Statistics of operation of transmitter

4.2.1 Settings

Parameters of microcontroller unit which operates with the specific type of the transmitter are set here. All operating parameters, communication settings and optional web-server settings are set in this menu. All parameters are protected by the password. Before modifying any of these parameters, correct password must be entered to unlock modify permission. After pressing the encoder wheel to enter the Settings menu the “Password?” message appears (Figure 5). Select letters by turning the encoder wheel. Each letter is confirmed by pressing the encoder wheel, letter will then change into asterisk (Figure 6). When the whole password is completed, press “OK” by F4 to confirm it.

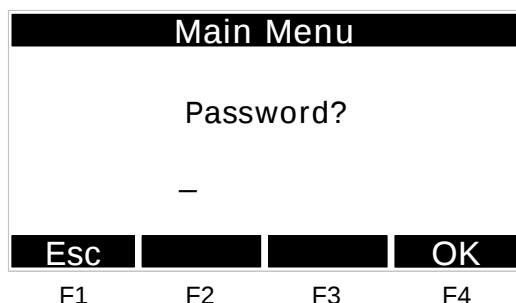


Figure 5: Password message

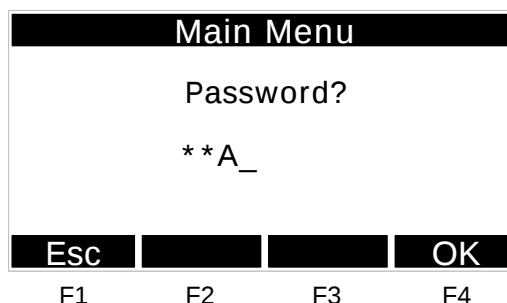


Figure 6: Password selection

In case of wrong password is selected, an error message appears (Figure 7). After pressing “OK” by encoder wheel settings menu will be appeared, but no changes can be made, because modify is denied (Figure 8).

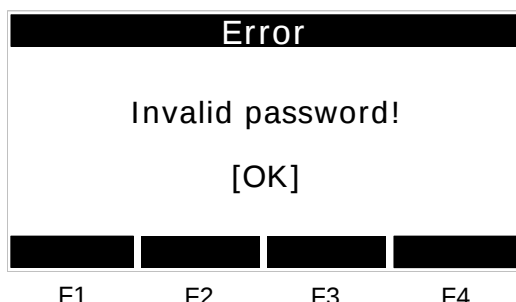


Figure 7: Invalid password message

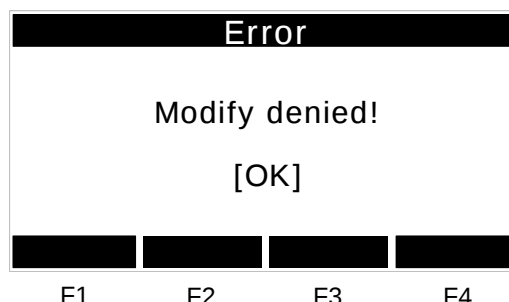


Figure 8: Modify denied message

If password is correct, a Settings menu appears (Figure 9).

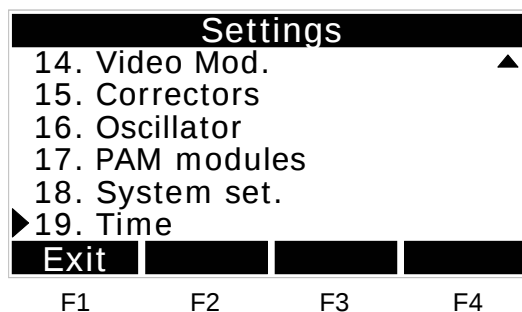
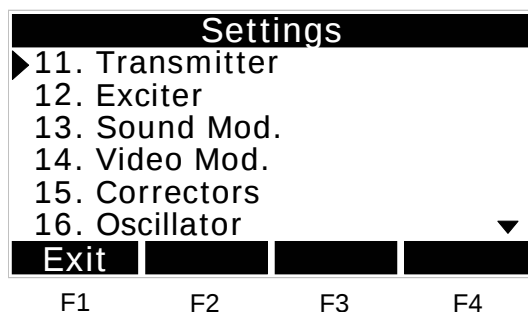


Figure 9: Settings menu

4.2.1.1 Transmitter settings

Transmitter settings menu is shown on Figure 10.

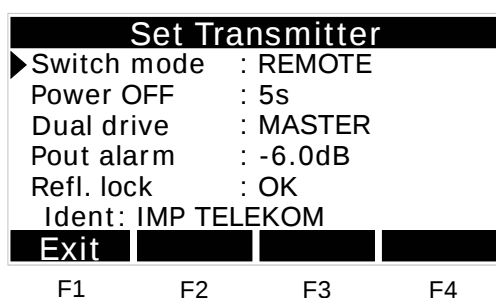


Figure 10: Transmitter settings

Switch mode

This is mode of transmitter power switch. When it is set to “AUTO” transmitter will start by presence of input signal at exciter and stop when input signal will disappear. In “MANUAL” mode transmitter can be start or stop only locally by power button (Fig.1. – 10). “REMOTE” mode is for start or stop transmitter by remote interface according to IEC 864-1 or by web-server. If switch mode is not “MANUAL”, power button can be used for emergency stop while transmitter operating. To return power switch to the previous state power button must be pressed again.

Power OFF

This menu allows setting the time after transmitter will stop, if there is no input signal present.

Dual drive

Priority of exciters in dual drive configuration is set here. When dual drive option is set to “MASTER” or “SLAVE” changeover unit will switchover to corresponding exciter if it has no failure and video is present. When “MANUAL” option is selected, only manual changeover is possible.

Pout alarm

A threshold for Low output power alarm is set in this menu. The range is from -1,0 up to -6,0 dB by 0,1 dB step.

Refl. lock

If reflected power at transmitter output becomes higher than specified level, transmitter will stop. Consequently a value “LOCKED” will appear in this menu. A reflection lock can be reset by encoder wheel. If after that there is no more high reflection on output, the “OK” value will appear.

Ident

This is a text to identify the transmitter. It can be the name of the TV station name, location of the transmitter, etc. By pressing the encoder wheel, function buttons are changed to text editor functions (Figure 11). F2 is for moving the cursor right, F3 is for adding a new character in the text, F4 is for deleting character under cursor. Characters are set by rotating the encoder wheel. When text is completed, it can be confirmed by pressing the encoder wheel.

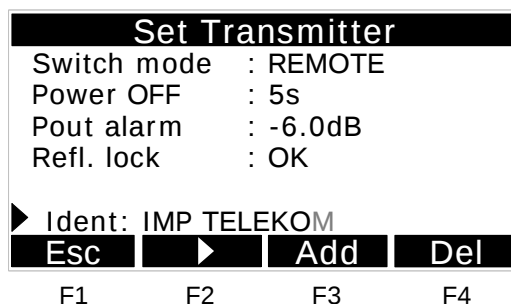


Figure 11: Set Identity

4.2.1.2 Exciter settings

Figure 12 shows exciter settings menu.

Pout

Output power of exciter can be set between +1 dB and -6 dB by step 0,1 dB when Exciter level is set to “AUTO”.

Level

The output level control of exciter can be set either to “AUTO” or “MANUAL”. This setting is associated with AGC regulation in IF/RF converter.

Gain lim.

Limitation of output power can be set from 0 to -12dB. Usually it is set from 1.5 to 2 dB above nominal output level.

AGC level

Range of AGC loop safe operation is modified in this menu. In normal operation it should be between 90 and 110 %

AGC point

Selection of point, where output power is measured, is selected in this menu.. (INTERNAL/EXTERNAL)

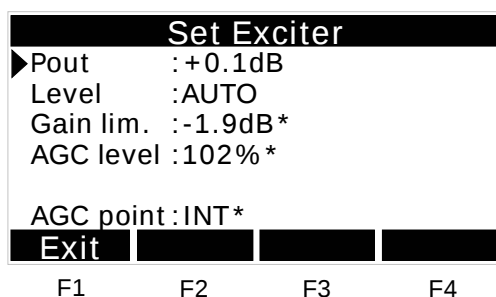


Figure 12: Exciter settings

*Only if IRCD-AVB is inserted

4.2.1.3 Sound Modulator

Figure 13 shows the Sound modulator menu. The following parameters with available values can be set:

- **G.AF1:** Sound 1 input gain can be set between -6 dB and +20 dB by step 0,1 dB
- **G.AF2:** Sound 2 input gain can be set between -6 dB and +20 dB by step 0.1 dB
- **SND Carr1:** Sound carrier 1 ON/OFF
- **SND Carr2:** Sound carrier 2 ON/OFF
- **Preemphasis:** ON/OFF
- **Pilot:** Pilot carrier ON/OFF
- **Coder:** STEREO/MONO/DUAL

Set Sound Modulator			
Gain AF1	:	+0.0dB	
Gain AF2	:	+0.0dB	
Snd Carr1	:	ON	
Snd Carr2	:	ON	
▶ Preemphasis	:	ON	
Pilot	:	ON	▼
Exit			
F1	F2	F3	F4

Set Sound Modulator			
Gain AF2	:	+0.0dB	▲
Snd Carr1	:	ON	
Snd Carr2	:	ON	
Preemphasis	:	ON	
Pilot	:	ON	
▶ Coder	:	STEREO	
Exit			
F1	F2	F3	F4

Figure 13: Sound modulator menu

4.2.1.4 Video Modulator

Figure 14 the Video modulator menu. The following parameters with available values can be set:

- **Input select:** AUTO/IN1/IN2
- **White limiter:** ON/OFF
- **White lim.Lev.:** White limiter level can be set from 97% to 109 % by 0,1% steps
- **Video AGC:** (Automatic gain control) AUTO/MANUAL
- **AGC Line:** (Selection of AGC line) 17/18
- **Manual Video:** Manual video gain can be set from 50% to 200% by 1% steps
- **Synchro Regen.:** Synchro regeneration ON/OFF
- **Synchro Level:** Synchro level can be set from 250 mV to 380 mV by 1 mV steps
- **Resid. Carrier:** Resident carrier can be set from -2% to +2 % by 0.1% steps
- **Vision Carrier:** ON/OFF

Set Video Modulator			
Input Select	:	AUTO	
White Limiter	:	ON	
White Lim. lev.:	:	103.0%	
Video AGC	:	AUTO	
▶ AGC Line	:	17	
Manual Video	:	100.0%	▼
Exit			
F1	F2	F3	F4

Set Video Modulator			
AGC Line	:	17	▲
Manual Video	:	100.0%	
Synchro Regen:	:	ON	
Synchro Level	:	300mV	
Resid. carrier	:	0.0%	
▶ Vision carrier	:	ON	
Exit			
F1	F2	F3	F4

Figure 14: Video modulator menu

4.2.1.5 Correctors

Figure 15 shows Correctors menu. The following options can be selected:

- **Basic:** Modify basic corrector
- **Advanced:** Modify advanced corrector
- **Adv. Cor. Memory:** Store or load settings of advanced corrector

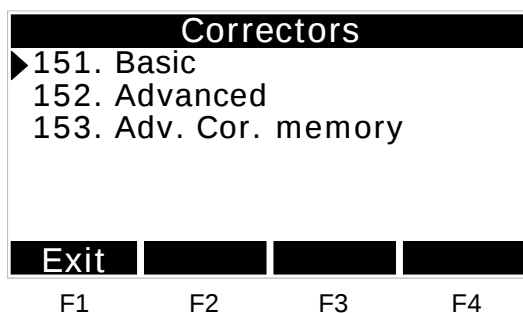


Figure 15: Correctors menu

151. Basic corrector

Figure 16 shows Basic corrector menu. The following parameters with available values can be set:

- **Correctors:** ON/OFF
- **Linearity:** ON/OFF
- **Segment 1:** Segment 1 can be set from 0% to 100% by 0.2% steps
- **Segment 2:** Segment 2 can be set from 0% to 100% by 0.2% steps

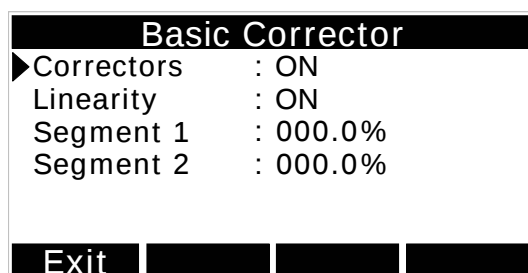


Figure 16: Basic corrector menu

152-MC. Advanced corrector (If KL-MC Corrector is inserted)

Advanced corrector menu can be seen on Figure 17. The following parameters with available values can be set. Individual segments can be modified by pressing F4 function button.

- **Linearity:** Linearity corrector ON/OFF
- **Group Dly:** Group delay ON/OFF

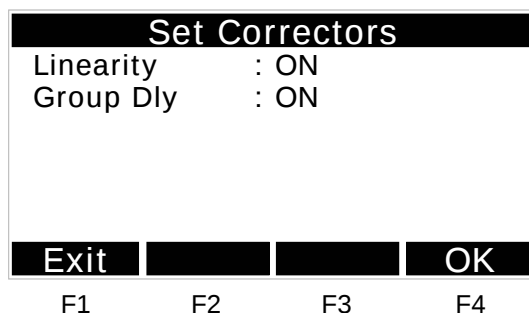


Figure 17: Advanced corrector menu

Individual segments

Individual segments can be seen on Figure 18. The following parameters with available values can be set. Individual segment (S1 to S4) can be selected with function buttons F2 and F3. Settings can be conformed with function button F4. Discard option (Figure 19) can be conformed with button F1. By selecting this option confirmation menu appears on display. Options can be selected by rotating and pressing encoder wheel.

- **Sx Thr:** Threshold of selected segment can be set from 0 % to 100 % in 0.5 % steps
- **Sx Sha:** Sharpness of selected segment can be set from 0 % to 100 % in 0.5 % steps
- **Sx I:** I of selected segment can be set from -100 % to 100 % in 0.5% steps
- **Sx Q:** Q of selected segment can be set from -100 % to 100 % in 0.5% steps

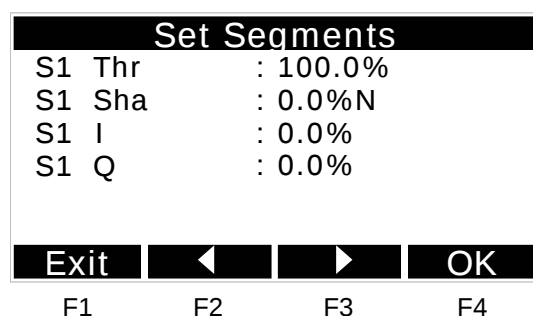


Figure 18: Segments menu

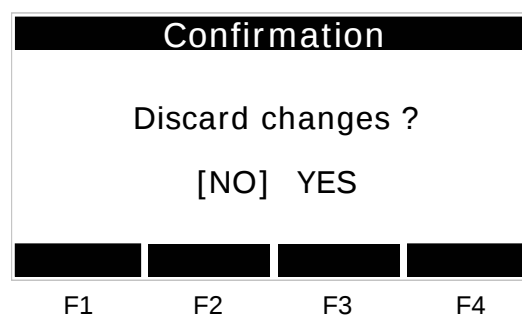


Figure 19: Discard conformation menu

152-HL. Advanced corrector (if KL-HL corrector is inserted)

Advanced corrector menu can be seen on Figure 20. The following parameters with available values can be set. Individual segments can be modified by pressing F4 function button.

- **Linearity:** Linearity corrector ON/OFF
- **Gain:** Gain can be set from -100% to +100%
- **Tilt:** Tilt can be set from -100% to +100%

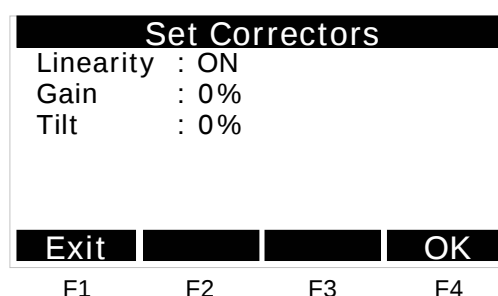


Figure 20: Advanced corrector menu

Individual segments

Individual segments can be seen on Figure 21. The following parameters with available values can be set. Individual segment (S1 to S6) can be selected with function buttons F2 and F3. Settings can be conformed with function button F4. Discard option (Figure 22) can be conformed with button F1. By selecting this option confirmation menu appears on display. Options can be selected by rotating and pressing encoder wheel.

- **Sx Thr:** Threshold of selected segment can be set from 0 % to 100 % in 0.5 % steps
- **Sx Sha:** Sharpness of selected segment can be set from 0 % to 100 % in 0.5 % steps
- **Sx I_L:** I_L of selected segment can be set from -100 % to 100 % in 0.5% steps
- **Sx Q_L:** Q_L of selected segment can be set from -100 % to 100 % in 0.5% steps
- **Sx I_H:** I_H of selected segment can be set from -100 % to 100 % in 0.5% steps
- **Sx Q_H:** Q_H of selected segment can be set from -100 % to 100 % in 0.5% steps

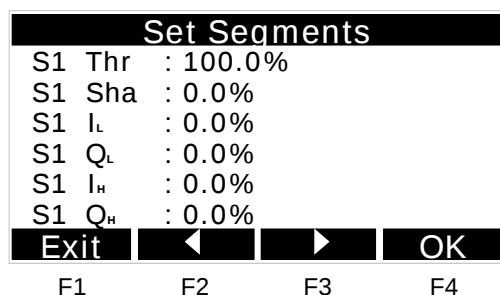


Figure 21: Segments menu

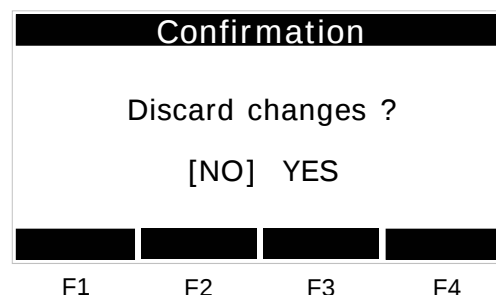


Figure 22: Discard conformation menu

153 Advanced corrector memory

Six different configurations of advanced corrector can be stored in memory (Figure 23). By pressing the encoder wheel, function buttons are changed to text editor functions (Figure 24). F2 is for moving the cursor right, F3 is for adding a new character in the text, F4 is for deleting character under cursor. Characters are set by rotating the encoder wheel. When text is completed, it can be confirmed by pressing the encoder wheel.

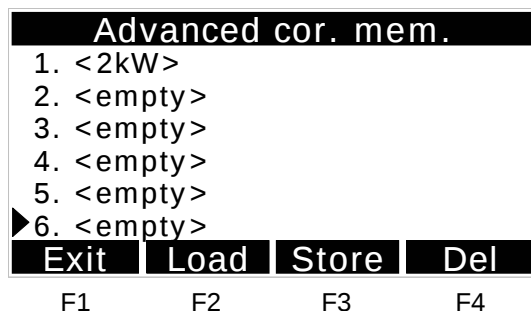


Figure 23: Advanced corrector memory menu

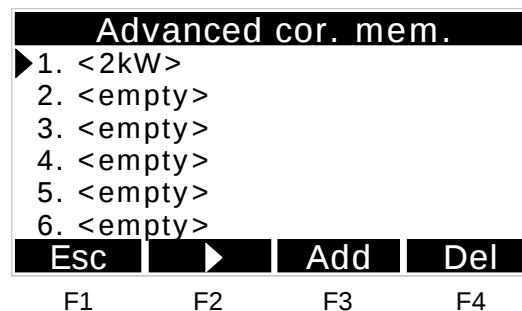


Figure 24: Name selection

4.2.1.6 Oscillator

Figure 25 shows oscillator settings menu. The following parameters can be set:

- **Chan.** (output RF channel): adjustable from 2 to 69,
- **Offs.** (Frequency offset from standard centre frequency): adjustable from -150 kHz to +150 kHz by 1 Hz step.
- **F.Cor.Coarse:** Coarse frequency correction from 0 to 1023.
- **F.Cor.Fine:** Fine frequency setting from -100 to +100%.
- **Ref:** Reference: INT: Internal manual setting of OCXO oscillator.
EXT: External 10,5,2,1 MHz synchronization

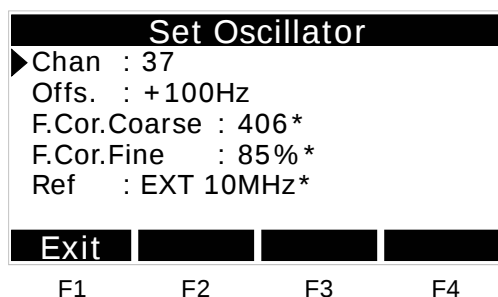


Figure 25: Oscillator settings menu

*If IRCD-AVB is inserted

Frequency offset and frequency correction can be set by encoder wheel and function buttons F1 and F2. That is shown on Figure 26 and Figure 27.

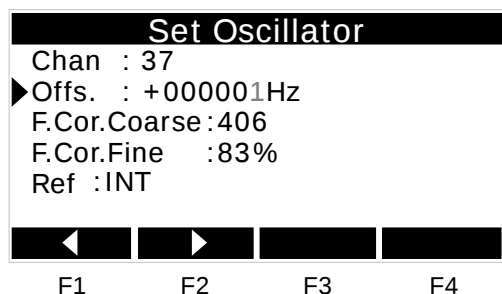


Figure 27: Frequency offset setting

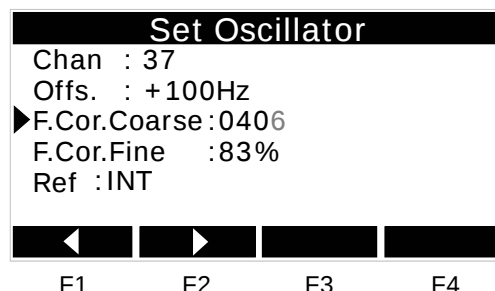


Figure 27: Frequency correction coarse setting

4.2.1.7 PAM modules

Figure 28 shows PAM settings menu.

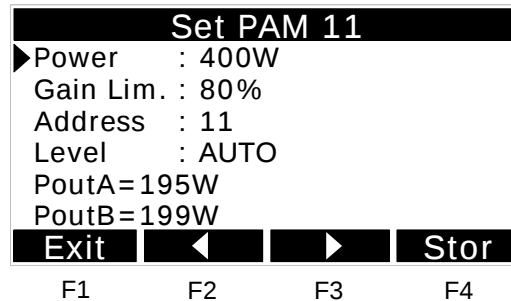


Figure 28: PAM settings menu

Power

This is desired output power of PAM module. It is a reference for ALC. When module has two outputs this is the sum of the both powers. For some transmitter types also question “Store all PAMs?” appears after conformation (Figure 29) to set all PAM modules to the same power if it is desired.

Gain Lim.

Maximum gain of ALC expressed in percents of maximum physical gain of module. This is also protection from power overshoot in critical circumstances.

Address

Each module in the transmitter has its unique address on RS485 bus. This address can be changed to the other valid address for current type of the transmitter. If address already exists on bus controller, it will report “PAM Already Exist” and no change will be made.

Level

When this setting is set to “MANUAL” ALC is stopped and current gain is preserved.

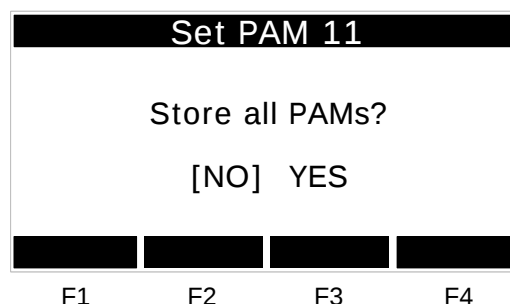


Figure 29: Power settings menu

4.2.1.8 System settings

Figure 30 shows System settings menu. These settings are usually set in factory for certain type of transmitter and must not be changed for proper transmitter operation. They are password protected and can be different from one type to another type of transmitter.

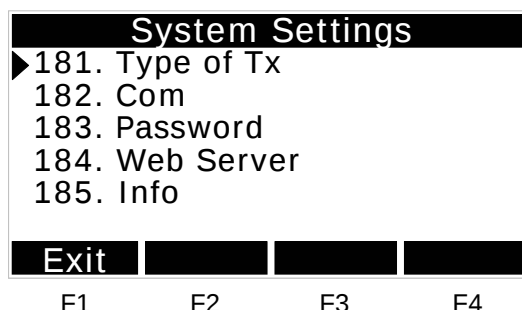


Figure 30: System settings

181. Type of Tx

This is the most important setting and defines type of the transmitter that will be controlled by microcontroller unit (Figure 31). Model, output power, driver power, method of metering and double drive option are defined in this menu.

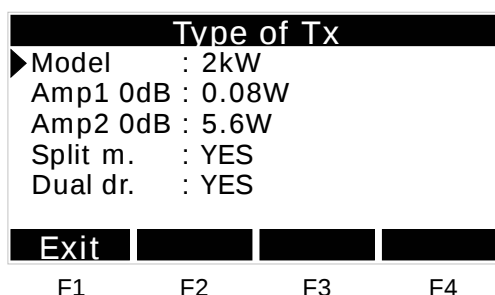


Figure 31: Type of transmitter

182. Com

Figure 32 shows settings for RS232 speed and addresses and RS485 addresses. They are password protected. RS485 speed is always 19200 bps.

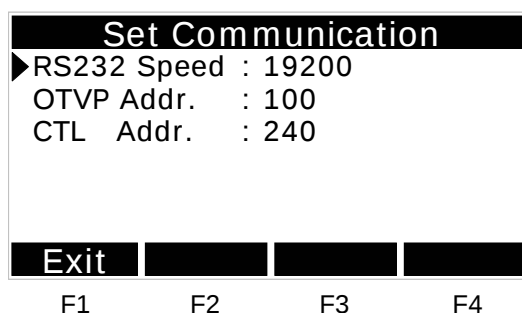


Figure 32: Communication settings

RS232 Speed

Speed of RS232 communication in bits per second. It must be set to the same value as on personal computer with software for control microcontroller unit. Available options are: 9600 and 19200.

OTVP Addr.

Address of transmitter for access with computer. RS232 port on rear panel can be converted to RS485 or similar by external converter. More than one transmitter, each with its own unique address can be connected to such network.

CTL Addr.

Address of controller (remote computer) to which transmitter will respond. If there is connected only one computer direct to RS232 port this address is usually set to 240.

183. Password

Password for modifying microcontroller settings is set from this menu item. At first the question if you really want to change password appears (Figure 33). Then correct old password must be entered (Figure 34) and finally new password (Figure 35), repeat of new password (Figure 36) and conformation (Figure 37). Refer to section “4.2.1 Settings” for entering password.

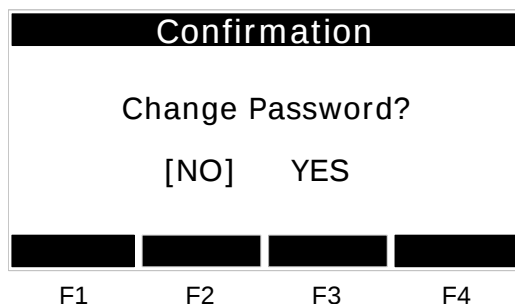


Figure 33

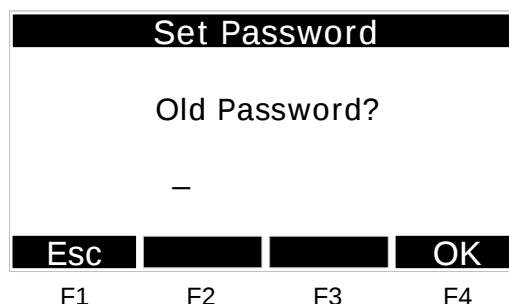


Figure 34

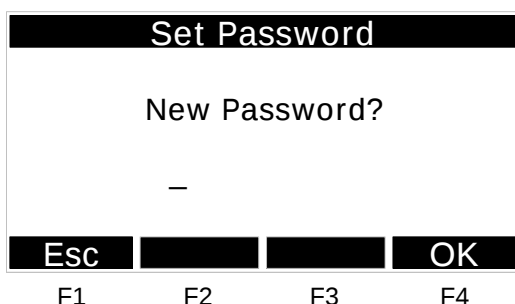


Figure 35

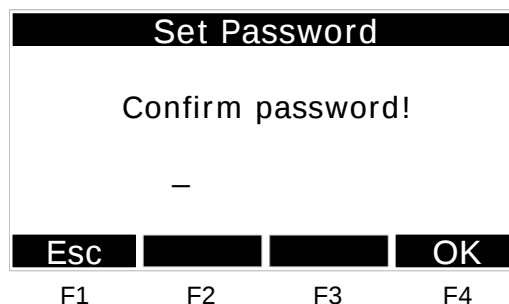


Figure 36

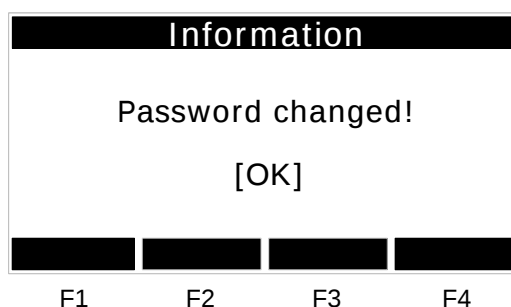


Figure 37

184. WEB/SNMP unit

This is configuration for web-server option. IP address, filtering, username and password for web access can be set there (Figure 38). There are four settings with format xxx.yyy.www.zzz where xxx, yyy, www and zzz are numbers in the range from 0 to 255. First number is accessed by pressing encoder wheel. Value is set by turning encoder wheel. Every next number is accessed by pressing F1 or F2 button (Figure 39). When last number is set and encoder wheel is pressed, whole setting is accepted.

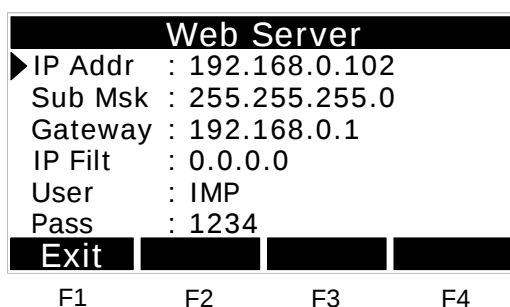


Figure 38: Web server settings

IP Addr

This is IP address of the web server. This number can be typed in the web browser to access site with the transmitter parameters.

Sub Msk

This is subnet mask and with combination of IP address identifies which network segment is transmitter on. Typically default subnet mask use either 0 or 255 as values (such as 255.255.255.0), but other number values can appear.

Gateway

This is address of gateway. It is a router that connects two separate network segments (for example local network and internet).

IP Filt

If this number is 0.0.0.0 any client (computer) can access transmitter web page otherwise only computer with same IP as this number can access web page.

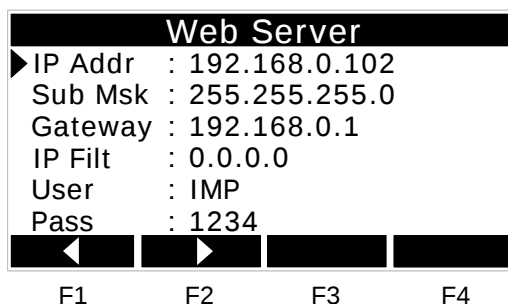


Figure 39: Settings of IP address

User

When the transmitter web-page is accessed, username and password is required. This is username for accessing page. By pressing encoder wheel text editor is appeared (Figure 40). Refer to the section 4.2.1.1 Set Transmitter (Identity) for detailed description of text editor.

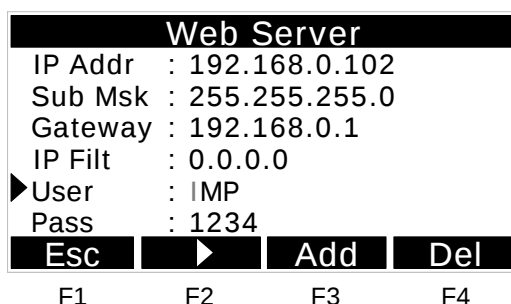


Figure 40: Setting of username

Pass

Figure 41 shows how to modify password for accessing the transmitter web-page. When encoder wheel is pressed, password can be changed.

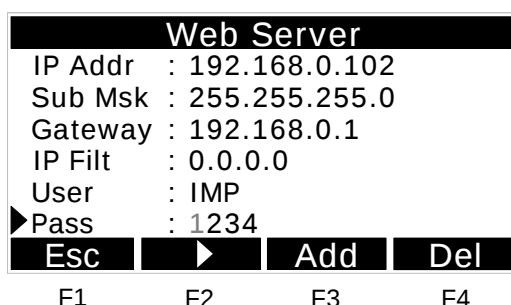


Figure 41: Setting of password

185. Info

Figure 42 and Figure 43 shows menu, where software versions of MCE and modules can be checked.

Info			
AVB 2kW			
V1.4 (C) 2005-2008			
			
Exit			Mod
F1	F2	F3	F4

Figure 42: Firmware info

Module Info			
Tx Control : V1.0			
Video Mod : V1.0			
Oscillator : V1.0			
Corrector : V1.0			
Exit			Inf
F1	F2	F3	F4

Figure 43: Modules info

4.2.1.9 Time settings

Microcontroller unit has its own real time clock. It is powered by lithium battery when mains power is absent. This clock is used as time stamp for event log and for web-server metering. It can be shown on base metering view. The Time setting menu is shown on Figure 44.

Set Time			
► Hour	:	18	
Min	:	28	
Sec	:	54	
Date	:	4	
Month	:	MAY	
Year	:	2006	
Exit			
F1	F2	F3	F4

Figure 44: Time settings menu

4.2.2 Metering

Metering menu allows checking main parameters and state of transmitter components, such preamplifiers, power amplifiers, sound modulator, video modulator, corrector, oscillator, IF/RF Converter and power supplies. Configuration of Metering menu depends of included modules in certain types of transmitters. Figure 45 shows metering menu, when exciter includes DDS oscillator.

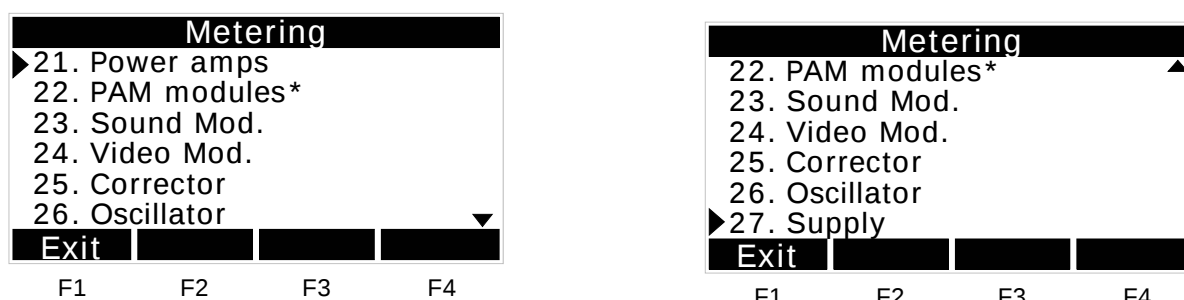


Figure 45: Metering menu with DDS oscillator

*If PAM modules are inserted

Figure 46 shows metering menu, when exciter includes IF/RF converter.

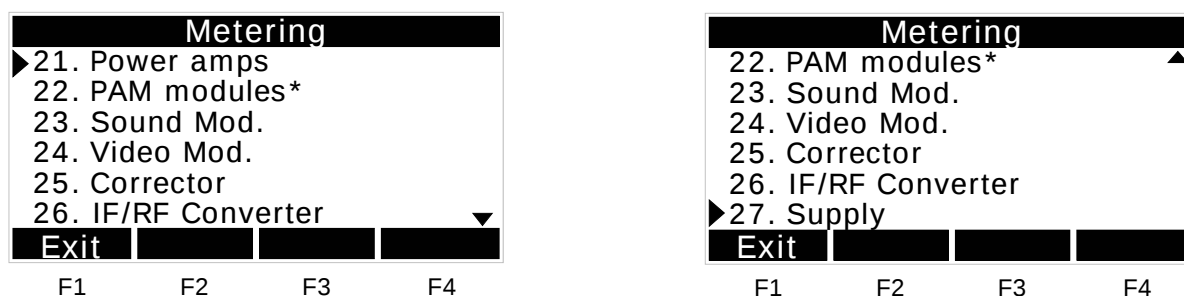


Figure 46: Metering menu with IF/RF Converter

4.2.2.1 Power amps

Main operating parameters of driver stage and output stage (if included) in exciter are presented.

Moving from one to another stage is done by pressing F2 or F3 function buttons. (Figure 47):

- output power in dB relative to nominal power
- nominal power in W
- supply voltage
- current consumption
- temperature

Driver stage	
Pout	=0.1dB
0dB	=2.00W
U28	=27.8V
I	=1.37A
Th	=34 °C
Exit	
F1	F2 F3 F4

Output stage	
Pout	=0.0dB
0dB	=50.0W
U28	=27.8V
I	=7.3A
Th	=36 °C
Exit	
F1	F2 F3 F4

Figure 47: Power amps metering menu

4.2.2.2 PAM modules

We can monitor the output and the reflected power, supply voltages, supply currents of power pallets, heat sink temperature and on some types of modules input RF power of each power amplifier module. Desired module is selected by the encoder wheel. If all of the measurements do not fit on display, the remaining measurements can be accessed by pressing F4 (Figure 48). Number of measurements depends on the module type.

Mon PAM 11 1/2				Mon PAM 11 2/2			
POUTA =173W		POUTB =176W		TH =45 °C		PIN =0dB	
PRFLA =0W		PRFLB =1W		U29 =29,4V		U80 =79V	
I1A =7,1A		I1B =7,2A		U1 =32,4V		IDR =5,7A	
I2A =7,2A		I2B =7,2A		U2 =32,5V		ICPA =2,1A	
I3A =7,1A		I3B =6,2A		U3 =32,5V			
I4A =7,2		I4B =7,3		U4 =32,5V			
Exit		Pg		Exit		Pg	
F1	F2	F3	F4	F1	F2	F3	F4

Figure 48: PAM metering menu

4.2.2.3 Sound Modulator

This menu (Figure 49) shows measurement of input audio signal AF1 (upper bar) and AF2 (lower bar) from -20 to +8 dB, (0dB = 6 dBm at 600 ohm)

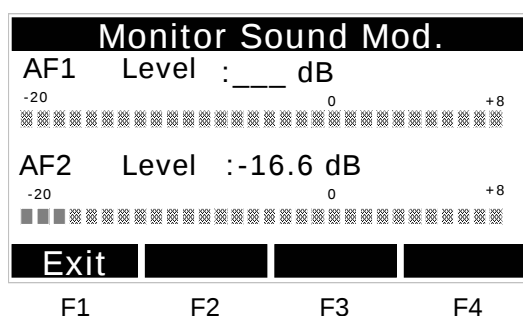


Figure 49: Sound modulator metering

4.2.2.4 Video Modulator

This menu (Figure 50) shows the parameters and state of video modulator.

- **Video In:** Video carrier level. If video is not present, line appears.
- **Sync.Rgl:** Input synchro impulse level in mV
- **White Rgl:** Sideband level in mV
- **Video AGC:** Automatic gain control of video signal
- **White clip:** Presence of white clip (YES/NO)
- **IF Level:** Level of IF output (OK/LOW)
- **VCO:** Control voltage on VCO in %
- **Th:** Module temperature

Video Modulator			
Video In.	=	VCO	=49%
Sync. Rgl	=624mV	Th	=35°C
White Rgl	=1mV		
Video AGC	=51%		
White Clip	:NO		
IF Level	:OK		
Exit			

F1 F2 F3 F4

Figure 50: Video modulator metering

4.2.2.5 Corrector

This menu (Figure 51) shows ALC level and temperature of corrector module.

Corrector			
ALC	=0%		
Th	=40°C		
Exit			

F1 F2 F3 F4

Figure 51: Corrector metering

4.2.2.6 Oscillator

This menu shows the parameters and state of DDS oscillator, if inserted (Figure 52):

- lock status of PLL
- relative UPLL
- relative Uocxo
- oscillator output voltage

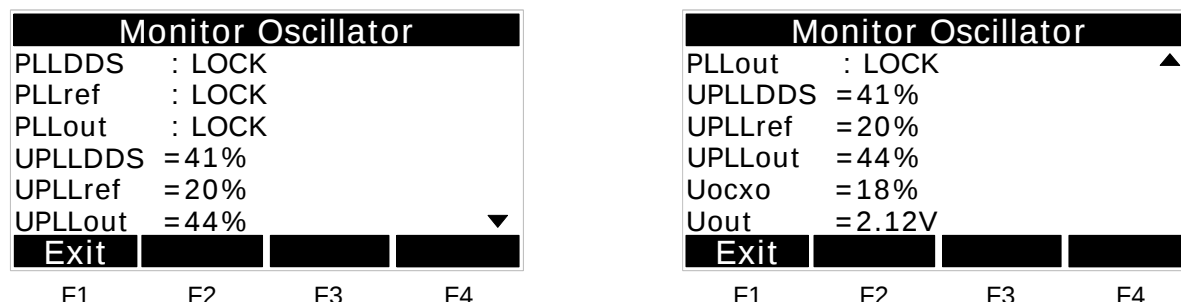


Figure 52: Oscillator metering

4.2.2.7 IF/RF Converter

Figure 53 shows parameters and state of IF/RF converter, if inserted.

- PLLQ: LOCK/ WORKING/UNLOCK
 - PLL IF: LOCK/UNLOCK
 - PLL Out: LOCK/UNLOCK
 - Ext ref: OK/LOW
 - UPLL Q: 0-100%
 - UPLL IF: 0-100%
 - UPLL out: 0-100%
 - Th: -20 to 100 °C
- operation of OCXO oscillator
operation of first oscillator
operation of second oscillator
presence of external reference
Control voltage of OCXO oscillator
Control voltage on first VCO
Control voltage on second VCO
Temperature inside module

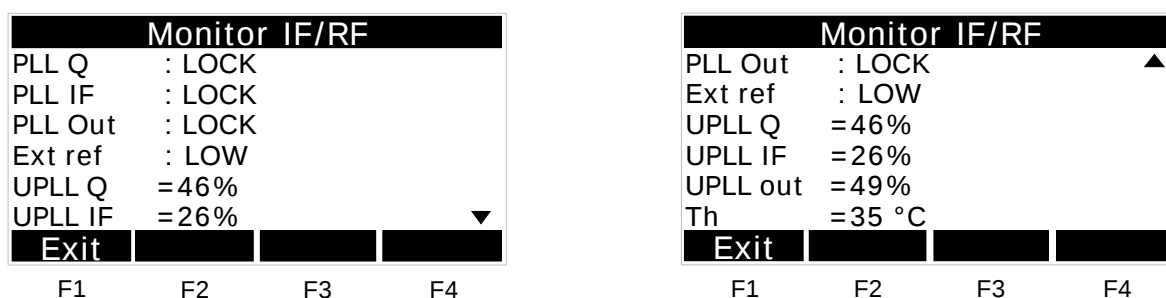


Figure 53: IF/RF metering

4.2.2.8 Supply

This menu monitors the power supply voltages of exciter (Figure 54).

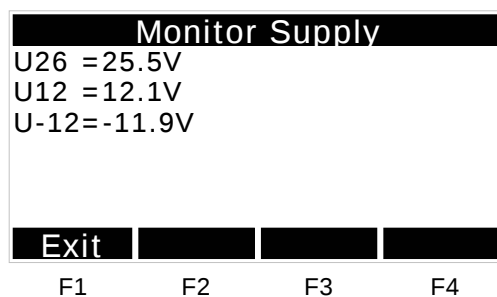


Figure 54: Supply metering

4.2.3 Status

Status shows current status of the transmitter (Figure 55). If there are no faults, display shows “Everything OK” (Figure 56).

Status			
01. F : 10MHz low 02. F : Pout low 03. F : PAM11 com.			
Exit			
F1	F2	F3	F4

Figure 55: Status with faults

Status			
----- EVERYTHING OK -----			
Exit			
F1	F2	F3	F4

Figure 56: Status with no faults

All possible events are described in chapter 5 “Faults, warnings, messages”.

4.2.4 Event list

History of events during the transmitter operation is stored in microcontroller unit. Event log holds up to 400 events. If log is full, first event is overwritten by a new one and then the second one and so on. Each event is divided into three parts:

- description text, accessed with F1 (Figure 57)
- time of occurrence, accessed with F2 (Figure 58)
- date of occurrence, accessed by F3 (Figure 59)

Event Log (Desc)			
01. M : Mains inter. 02. F : 38M9Hz PLL			
Desc	Time	Date	Clr
F1	F2	F3	F4

Figure 57: Event description

Event Log (Time)			
01. Time 18:10:15 02. Time 18:10:33			
Desc	Time	Date	Clr
F1	F2	F3	F4

Figure 58: Event time

Event Log (Date)			
01. Date	25.Mar.2007		
02. Date	25.Mar.2007		

Figure 59: Event date

All possible events are described in chapter 5 “Faults, warnings, messages”.

Event log can be cleared by pressing F4. A password (Figure 60) and conformation window appears (Figure 61).

Event Log			
Password?			
—			
Esc			OK
F1	F2	F3	F4

Figure 60: Password required

Confirmation			
Clear Event List?			
[NO] YES			
F1	F2	F3	F4

Figure 61: Conformation window

After Event log is empty, a message window appears (Figure 62):

Information			
Event List cleared!			
[OK]			
F1	F2	F3	F4

Figure 62: Event log is empty

When entering the empty Event log, the following window appears (Figure 63):

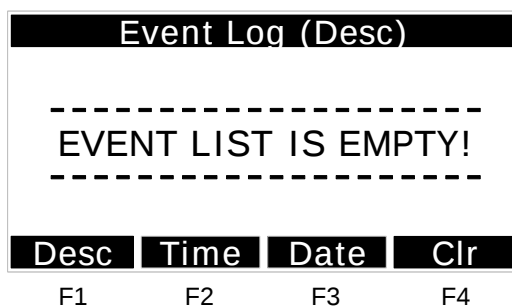


Figure 63: Empty event log

4.2.5 Statistics

Operation time of transmitter, MCU in hours and number of power ups are stored in microcontroller unit (Figure 64).

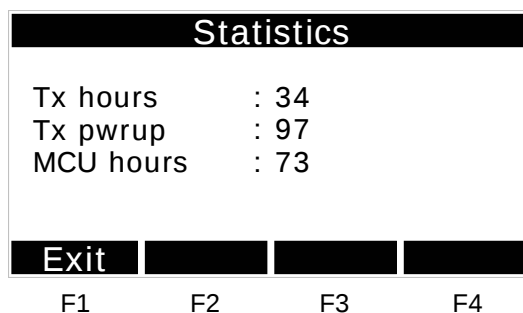


Figure 64: Statistics

5. Faults, warning, messages

Faults, warnings and messages, shown in Event list or Status menu, have the same format as follows:

N.X:[message text]

N: consecutive number of event or status message

X: type of message

- F Fault
- W Warning
- M Message (messages are shown only in Event list)

5.1 Faults

Message text	Meaning
F: Osc.PLL	No oscillator output
F: Ext.PLL	External reference signal present, but not proper one selected in “Ref” menu of oscillator settings
F: RF Channel	Wrong RF channel selected
F: Pout low	Output power lower than threshold, set in “Pout alarm” of transmitter settings menu
F: Psnd low	Sound power low
F: Prfl high	Reflected power on transmitter output is above allowed level
F: I2C 0x50	Fault in I ² C communication between MCU and DDS oscillator
F: I2C 0x7C	Fault in I ² C communication between MCU and Remote board
F: I2C 0x7E	Fault in I ² C communication between MCU and OTVOTVP control board
F: I2C 0x72	Fault in I ² C communication between MCU and group delay
F: I2C 0x60	Fault in I ² C communication between MCU and video modulator
F: I2C 0x48	Fault in I ² C communication between MCU and sound modulator
F: I2C 0x70	Fault in I ² C communication between MCU and Corrector
F: I2C 0x52	Fault in I ² C communication between MCU and IRCD-AVB
F: Bas. Temp	Temperature of first preamplifier stage too high (RFA 4002, RFA 410)
F: Dr. Temp	Temperature of second preamplifier stage too high (MK 4/250)
F: Pow. Temp	Temperature of external power amplifier stage too high
F: AC P.Stage	AC supply voltage of external power amplifier stage failed
F: No ILock	Interlock loop is not closed
F: Air temp. High	Air temperature inside of transmitter’s cabinet is too high
F: Soft.s. Cont.	Fault on soft start contactor of AC supply voltage
F: Main Cont.	Fault on main contactor of AC supply voltage
F: Tx mains int.	Main supply fault

F: Liquid cooling	Fault in liquid cooling system, transmitter will automatically shut down
F: Air cool pres	Fault in air cooling system.
F: Air cool fan	Fault on AIR cool fan.
F: 38M9Hz PLL	PLL synchronization failure
F: Quartz	OCXO PLL unlock
F: Sync.Reg	Synchro regenerator failure
F: SAW F. OFF	Channel filter is switched off. Frequency diagram is linear
F: Clamp Err.	Error in clamp circuit in VM module
F: Pilot PLL	Only stereo option. No PLL for pilot carrier
F: IF Snd Low	IF sound carrier low
F: Snd C. PLL	Sound carrier PLL; IF sound carrier is not locked, output frequency is not controlled
F: PAM x com.	Communication with PAM x failed (x – PAM address)
F: PAM x	PAM x general fault (x – PAM address)
F: PAM x temp.	Temperature in PAM x is too high (x – PAM address)
F: PAM x reflect.	Reflected power in PAM x is too high (x – PAM address)

5.2 Warnings

Message text	Meaning
W: Osc.L Low	Low oscillator output level
W: Ex.Ref.Low	Too low level of external reference signal
W: Ext.PLL	An oscillator circuit for synchronization with reference signal is out of safe range
W :AGC range	AGC is out of safe range
W: U28 Low	Supply voltage 28 V too low
W: U26 Low	Supply voltage 26 V too low
W: U28 High	Supply voltage 28 V too high
W: U26 High	Supply voltage 26 V too high
W: U12 Low	Supply voltage 12 V too low
W: U12 High	Supply voltage 12 V too high
W: U-12 Low	Supply voltage -12 V too low
W: U-12 High	Supply voltage -12 V too high
W: U32(1) Low	First supply voltage 32 V too low
W: U32(1) High	First supply voltage 32 V too high
W: U32(2) Low	Second supply voltage 32 V too low
W: U32(2) High	Second supply voltage 32 V too high
W: Bas. Temp	Temperature of first preamplifier stage high (RFA 4002, RFA 410)
W: Dr. Temp	Temperature of second preamplifier stage high (MK 4/250)
W: Pow. Temp	Temperature of external power amplifier stage high
W: Liquid Cooling	Error in liquid cooling system, transmitter will not shut down
W: Air cool filt.	Error in air cooling system. Transmitter will not shut down.
W: IF Vis. Low	IF vision carrier low
W: U PLL Low	Local oscillator PLL voltage low (<2 V)

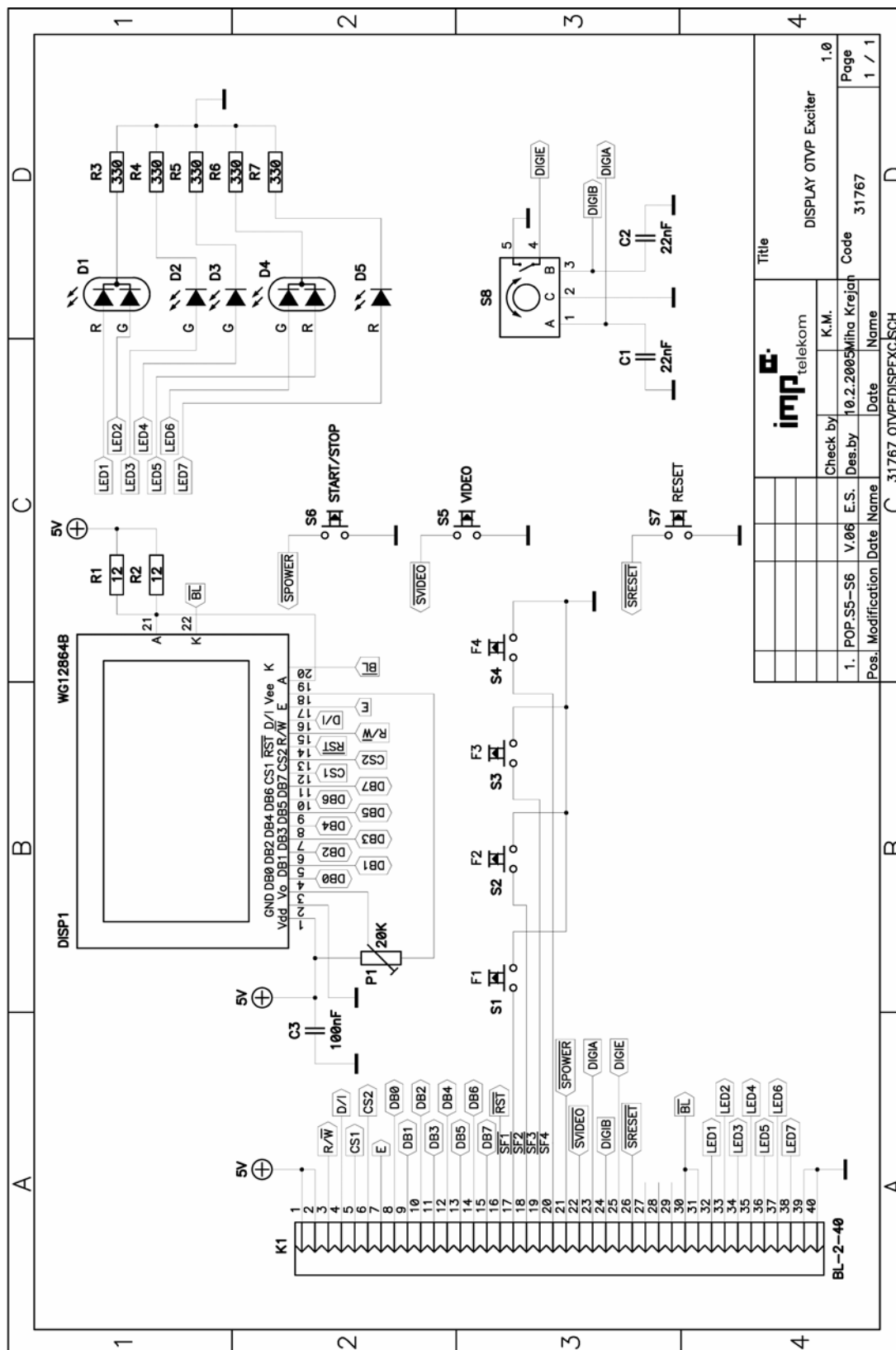
3.1

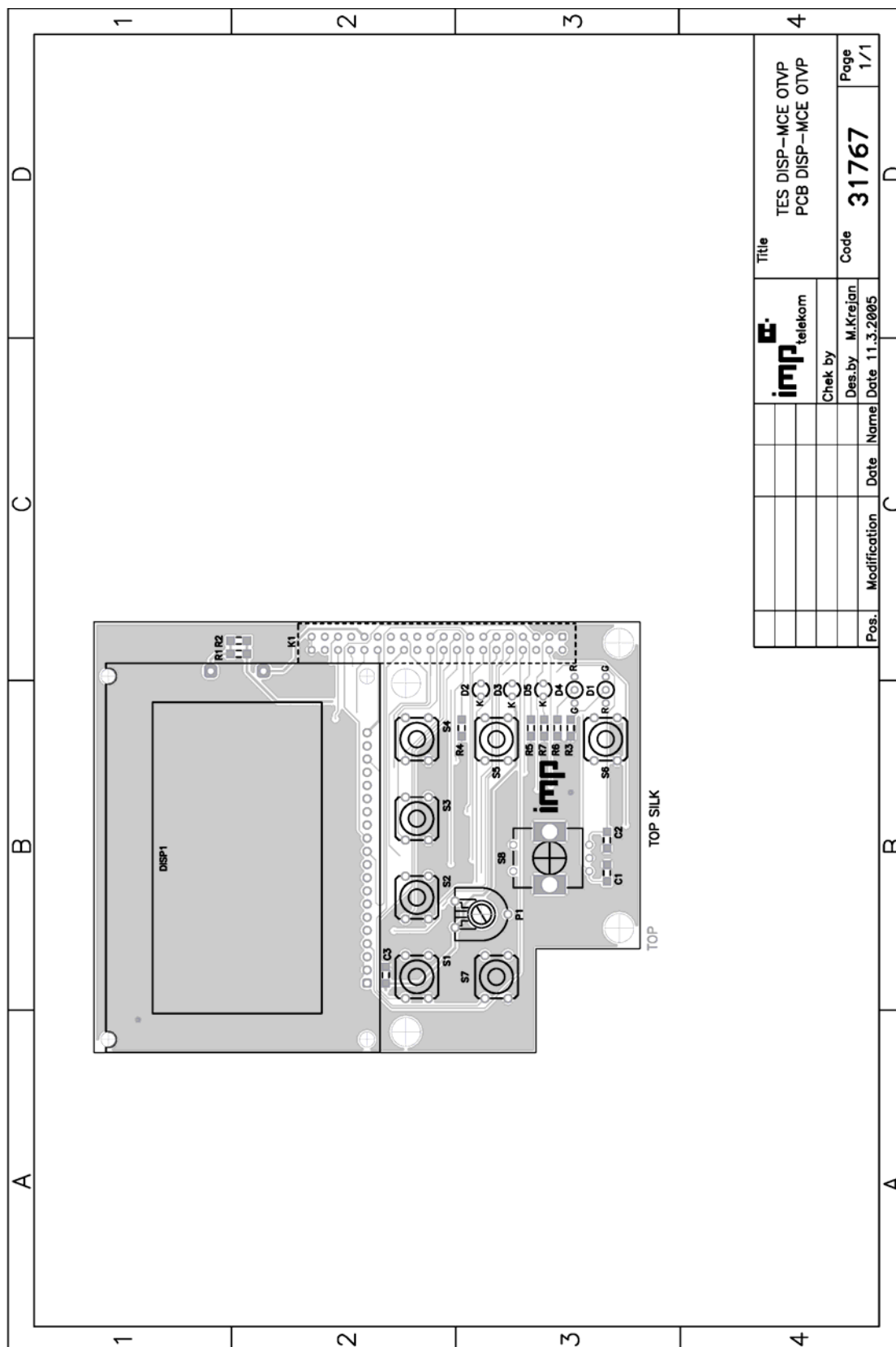
W: U PLL High	Local oscillator PLL voltage high (>8 V)
W: No V.M.Ref	No input ref. Signal for synchronization PLL oscillator 38,9 Mhz in VM module
W: V.AGC Line	No video measuring line 17 or 18 in VM module
W: Vid.M.VCO	VCO 38,9 Mhz control voltage in VM is out of range.
W: Vid M temp	Temperature in video modulator module too high
W: Cor. temp	Temperature in corrector module too high
W: Cor.gdly temp	Temperature in group delay module too high
W: IF/RF temp	Temperature in IF/RF module too high
W: Rec.Eq.OFF	Group delay pre-corrector in VM module
W: V.Carr.OFF	IF vision carrier in VM is switched off
W: Pilot Sync	No input synchronization signal – line frequency 15625 Hz

5.3 Messages

Message text	Meaning
M: Tx power ON	Transmitter switched ON
M: Tx power OFF	Transmitter switched OFF
M: Sw. -> AUTO	Switch mode of transmitter set to AUTO
M: Sw. -> MANUAL	Switch mode of transmitter set to MANUAL
M: Sw. -> REMOTE	Switch mode of transmitter set to REMOTE
M: Mains inter.	Mains voltage interruption
M: Mains restored	Mains voltage return
M: Man. rfl reset	Reflection lock reset manually
M: Auto rfl reset	Trial for automatic reflection reset
M: Pout restored	Output power restored
M: Psnd restored	Sound power restored
M: Video 1 present	Video 1 signal present
M: Video 1 lost	Video 1 signal lost
M: Video 2 present	Video 2 signal present
M: Video 2 lost	Video 2 signal lost

3. Electrical diagram for display





5. Bill of material for PCB Display – MCE OTVP

	Designation:	Stock No.	Page:		File:	
	PCB DISPLAY-MCE OTVP	31767	Date:	11.11.05	Disk:	

[illegible]

The image shows a detailed electronic circuit diagram for a microcontroller-based system. The central component is a microcontroller, likely an 8051, with various pins connected to peripheral devices. The circuit includes:

- Power Supply:** A 5V supply is connected to the VCC pin of the microcontroller and other components. A 100nF capacitor is connected to the GND pin.
- Memory:** Several memory chips are present, including 62256AJ (RAM), 62256AJ (ROM), and 62256AJ (EEPROM).
- Input/Output:** The microcontroller is connected to various input and output devices, including LEDs, switches, and a keyboard matrix.
- Timing:** A 11.0592MHz crystal oscillator is connected to the microcontroller's XTAL1 and XTAL2 pins.
- Control:** The microcontroller is connected to various control lines, including ALE, PSEN, and RST.

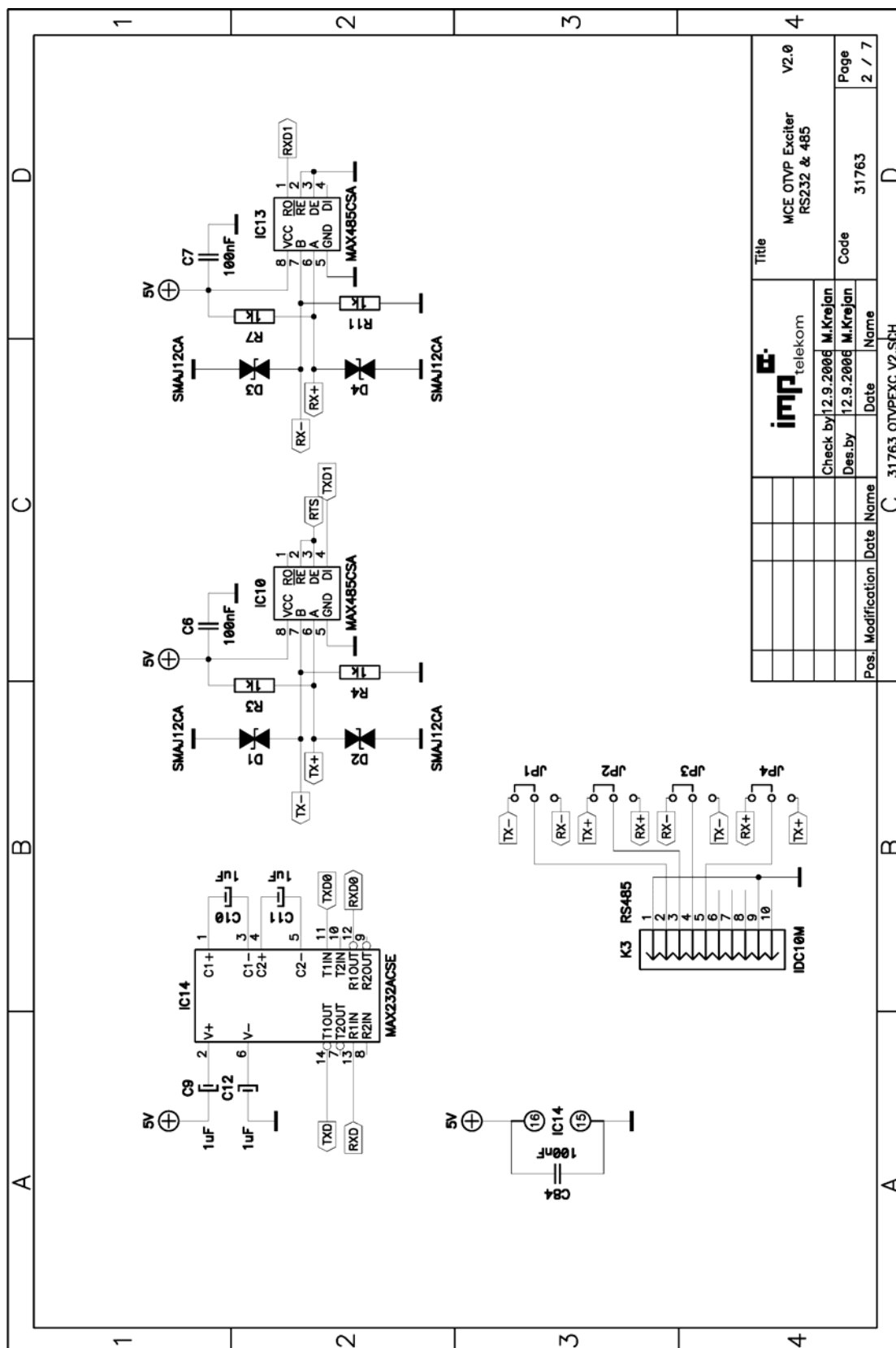
The diagram is a complex schematic showing the internal connections of the microcontroller and the external components it controls. It includes a title block with the following information:

Title	Project	Page
Microcontroller	Microcontroller	1 / 7

The diagram is a complex schematic showing the internal connections of the microcontroller and the external components it controls. It includes a title block with the following information:

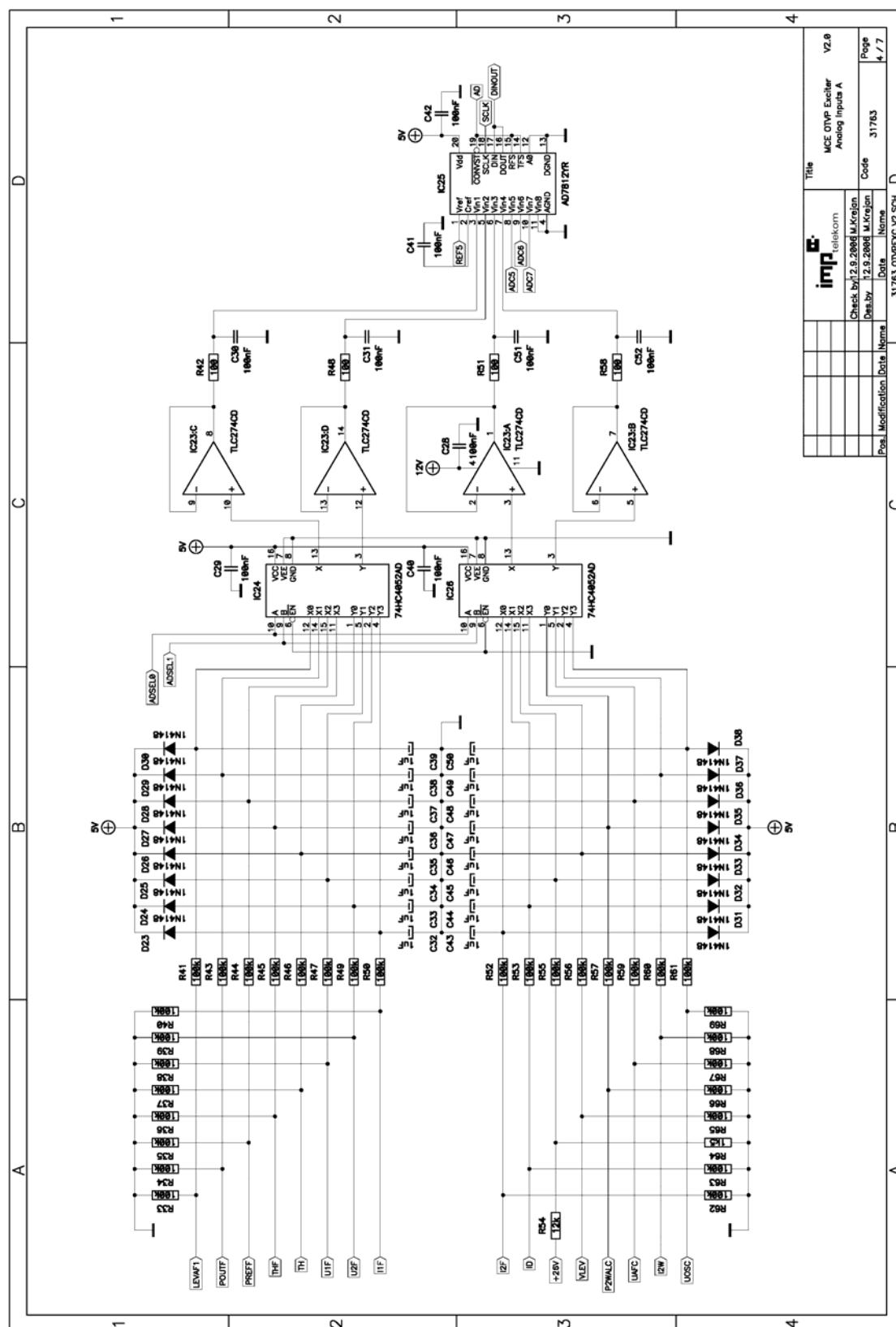
Title	Project	Page
Microcontroller	Microcontroller	1 / 7

7. Electrical diagram for MCE (RS232 & 485)



Title		MCE OTVP Exciter Digital Input/Output		V2.9	
Check by		12.5.2008 M.Kregan		Page	
Date by		12.5.2008 M.Kregan		3 / 7	
Code		31783		Pos. Modification	
Date		Name			

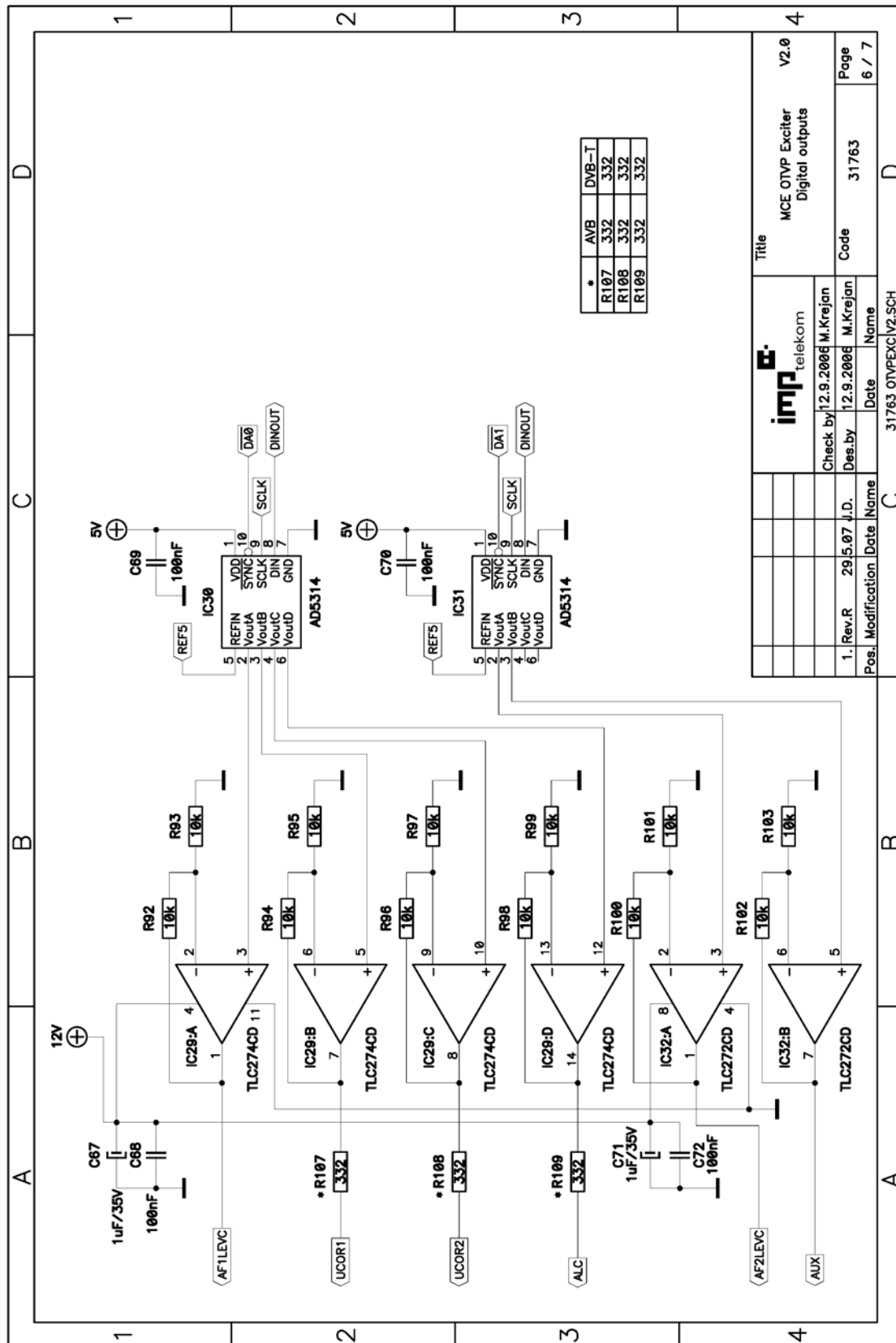
9. Electrical diagram for MCE (Analog Inputs A)



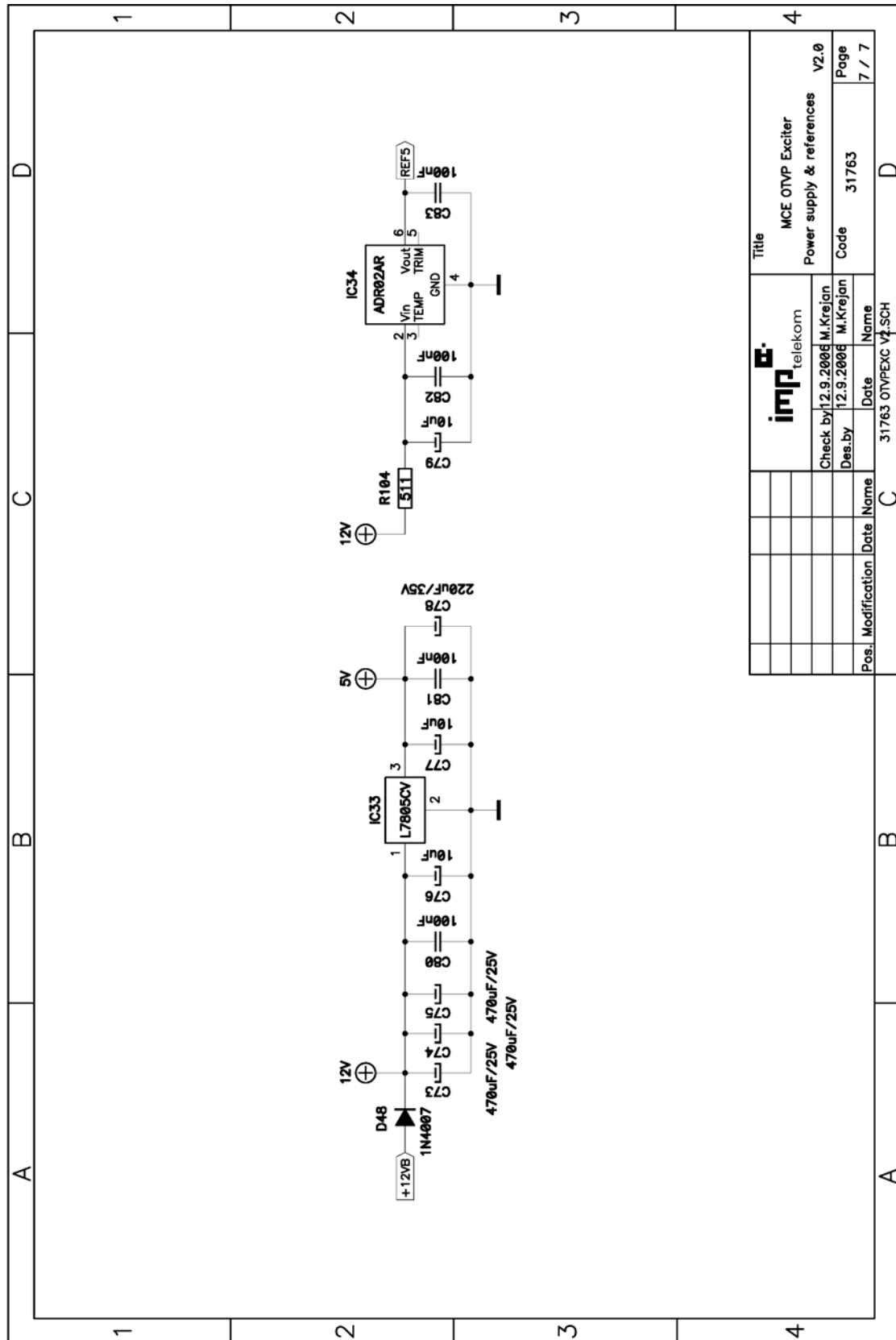
Pos.	Modification	Date	Name

Title		MCE OTVP Exciter Analog Inputs B	
Check by 12.9.2006 M.Krejan		V2.0	
Des.by 12.9.2006 M.Krejan		Code 31763	
		Page 5 / 7	

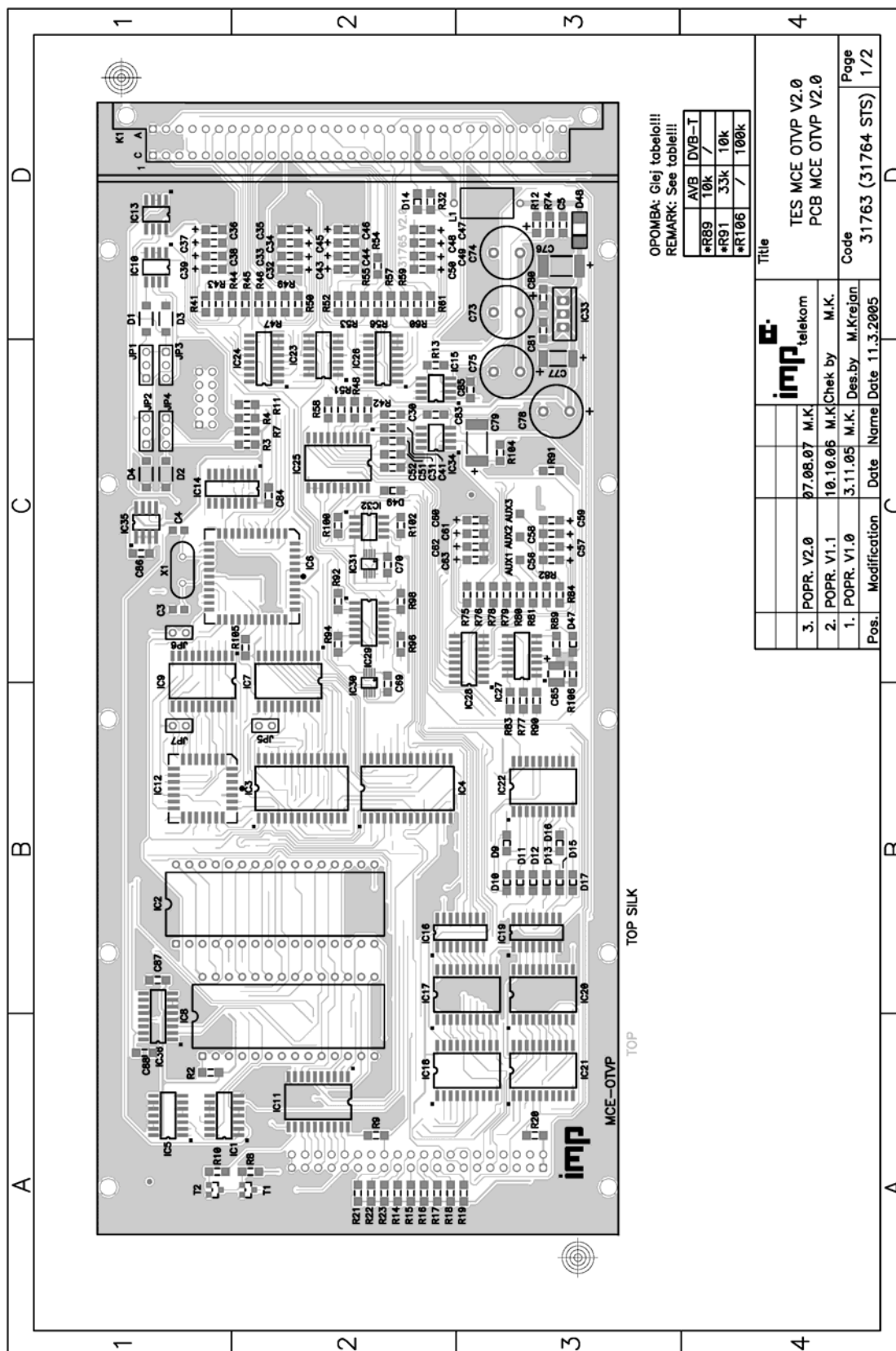
11. Electrical diagram for MCE (Digital Outputs)

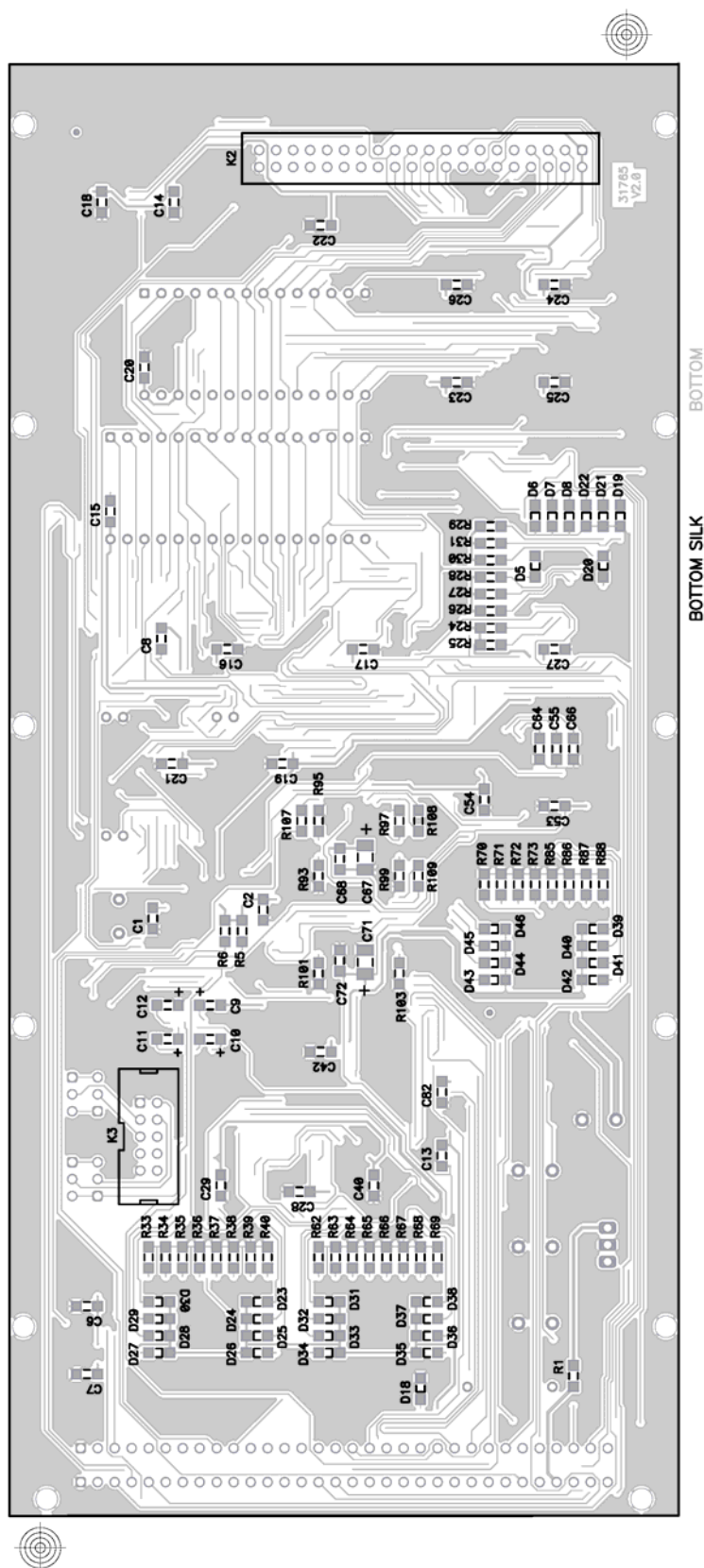


12. Electrical diagram for MCE (Power Supply & references)



13. PCB MCE OTVP





TES MCE OTVP V2.0
PCB MCE OTVP V2.0

31763 (31764 STS) 2/2

14. Bill of material for PCB MCE-OTVP V2.0

	Designation:	Stock No.	Page		File:	
	PCB MCE-OTVP V2.0	31763	Date:	8.20.07	Disk:	
		31764 (STS)		5.19.09		

No IMP	Pcs	Designation	Stock No.	Signature	Rem./Ven.
2	1	PCB MCE-OTVP V2.0	31765		IMP
5	1	IC SMD 74HC75D SO16	33491-385075675	IC36	PHILIPS
6	1	IC SMD 74HC00D SO14	6570-385075600	IC1	PHILIPS
8	1	IC SMD 74HC86 SO14	31769-385075686	IC5	PHILIPS
10	3	IC SMD 74HC541D SO20,SOT163A	6587-385075854	IC18,IC21,IC22	PHILIPS
12	5	IC SMD 74HC573D SOT163-1	6588-385075873	IC7,IC9,IC11,IC17,IC20	PHILIPS
14	3	IC SMD 74HC4052D SO16	6582-385075820	IC24,IC26,IC28	PHILIPS
16	2	IC SRAM 62256 ALJ SOP-28	6535-385072758	IC3,IC4	SAMSUNG
17	2	IC ULN 2003 D SO-16	6908-385094004	IC16,IC19	ST
18	1	IC TLC 272 BCD SO8	6666-385083272	IC32	TI
19	3	IC TLC 274 CD SO14	30984-385083274	IC23,IC27,IC29	TI
20	1	GAL PROGRAM. PLL-UHF (OTVP-MCE)	31770-801610358	IC12	IMP
21	1	EPROM PROGRAM. P2.0 MCE-OTVP	31771-801610359	IC2	IMP
22	1	IC M48T08 DIP-28	6537-385072760	IC8	ST
23	1	IC SMD MAX 232 ACSE SO16	6818-385088282	IC14	MAXIM
24	1	IC MAX 707 CSA SO8	6816-385088277	IC15	MAXIM
25	2	IC SMD MAX 485 CSA SO8	6819-385088285	IC10,IC13	MAXIM
26	1	IC P89C669 FA	31756-385078669	IC6	PHILIPS
27	1	IC FRAM FM24C256-G SOIC-8	33459-385072767	IC35	RAMTRON
28	1	TRANS SMD (NPN) BC 847B	6476-385046848	T2	PHILIPS
30	1	TRANS SMD (NPN) BC 817-25	6474-385046817	T1	PHILIPS
32	1	VOLTAGE REGUL. LM 7805 CT TO-220	6844-385088805	IC33	NSC
34	2	IC AD 5314 BRM MSOIC-10	6925-385095021	IC30,IC31	ANALOG DEVICE
36	1	IC AD7812 YR SOIC20	31758-385088256	IC25	ANALOG DEVICE
38	1	IC ADR02 AR SO8	6815-385088254	IC34	ANALOG DEVICE
42	1	CAP EL 220UF 35V 10X12 R5 T	5671-383400042	C78	FROLYT
44	3	CAP EL 470UF 25V 10X18 R5 M	5706-383405470	C73,C74,C75	FROLYT
46	1	CAP TANSMD 0.1UF 35V A M	6236-384649001	C65	KEMET

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	PCB MCE-OTVP V2.0	31763	Date:	8.20.07	Disk:	
		31764 (STS)		5.19.09		

No IMP	Pcs	Designation	Stock No.	Signature	Rem./Ven.
47	28	CAP TANSMD 1UF 20V A M	6238-384650002	C9,C10,C11,C12,C32,C33,C34,C35,C36,C37,C38,C39,C43,C44,C45,C46,C47,C48,C49,C50,C56,C57,C58,C59,C60,C61,C62,C63	KEMET
48	2	CAP TANSMD 1UF 35V B M	6239-384650100	C67,C71	KEMET
50	1	CAP TANSMD 10UF 16V C M	6244-384651009	C77	KEMET
52	2	CAP TANSMD 10UF 35V D M	6246-384651011	C76,C79	KEMET
54	2	CAP SMD 33PF 50V CG 0805 K	6178-384601330	C3,C4	YAGEO
56	42	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C1,C2,C5,C6,C7,C8,C13,C14,C15,C16,C17,C18,C19,C20,C21,C22,C23,C24,C25,C26,C27,C28,C29,C40,C41,C42,C52,C53,C54,C66,C68,C69,C70,C72,C80,C81,C82,C83,C84,C85,C86,C87,C88	YAGEO
57	6	CAP SMD 10NF 50V X7R 1206 M	6213-384604101	C30,C31,C51,C52,C55,C64	YAGEO
58	4	DIODE SUPRES SMAJ12CA 12V	7180-385340012	D1,D2,D3,D4	ST
60	1	CHOKE FERITNA D6L 3C 3,8UH-02	5115-373980101	L1	ISKRA
64	1	DIODE SMD -MELF SM4007	7168-385290407	D48	DIOTEC
66	44	DIODE SMD LL4148 MELF	7167-385290148	D5,D6,D7,D8,D9,D10,D11,D12,D13,D14,D15,D16,D17,D18,D19,D20,D21,D22,D23,D24,D25,D26,D27,D28,D29,D30,D31,D32,D33,D34,D35,D36,D37,D38,D39,D40,D41,D42,D43,D44,D45,D46,D47,D49	DIOTEC
74	1	RESISTOR SMD 7K5 1206 0,25W 1%	8885-393011750	R74	VITROHM
76	2	RESISTOR SMD 1K5 1206 0,25W 1%	8861-393011150	R64,R70	VITROHM
78	1	RESISTOR SMD 1R 1206 0,25W 5%	8669-392020100	R1	VITROHM
79	1	RESISTOR SMD 511R 1206 0,25W 1%	8850-393010510	R104	VITROHM
80	4	RESISTOR SMD 1K 1206 0,25W 1%	8856-393011100	R3,R4,R7,R11	VITROHM
82	2	RESISTOR SMD 1K82 1206 0,25W 1%	8864-393011180	R5,R6	VITROHM
84	2	RESISTOR SMD 4K75 1206 0,25W 1%	8879-393011470	R8,R10	VITROHM

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		31764 (STS)		5.19.09		

No IMP	Pcs	Designation	Stock No.	Signature	Rem./Ven.
88	36	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R2,R9,R13,R14,R15,R16,R17,R18,R19,R20,R21,R22,R23,R24,R25,R26,R27,R28,R29,R30,R31,R32,R91,R92,R93,R94,R95,R96,R97,R98,R99,R100,R101,R102,R103,R105	VITROHM
96	1	RESISTOR SMD 68K1 1206 0,25W 1%	8911-393012681	R12	VITROHM
98	7	RESISTOR SMD 100R 1206 0,25W 1%	8833-393010100	R42,R48,R51,R58,R77,R83,R90	VITROHM
99	3	RESISTOR SMD 332R 1206 0,25W 1%	8710-392022332	R107,R108,R109	VITROHM
100	47	RESISTOR SMD 100K 1206 0,25W 1%	8914-393013100	R33,R34,R35,R36,R37,R38,R39,R40,R41,R43,R44,R45,R46,R47,R49,R50,R52,R53,R55,R56,R57,R59,R60,R61,R62,R63,R65,R66,R67,R68,R69,R71,R72,R73,R75,R76,R78,R79,R80,R81,R82,R84,R85,R86,R87,R88,R106	VITROHM
102	1	RESISTOR SMD 12K 1206 0,25W 1%	8891-393012120	R54	VITROHM
104	1	QUARZ KRISTAL HC-49/U-S 11.0592 MHZ	7444-386084102	X1	SAUCH
116	1	CONNECTOR ANGLE 64-P (M) STV-C-64-M-AC	4795-373908368	K1	ERNI
118	1	CONNECTOR HEADER 10-POL (M) 281271-1	4745-373908264	K3	ERNI
130	1	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R89(FOR ANAL. TRANS.)	VITROHM
132	1	RESISTOR SMD 33K 1206 0,25W 1%	8904-393012330	R91(FOR ANAL. TRANS.)	VITROHM

3.2 Sound Modulator MSP-M V2.0

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7. Electrical diagram of MSP-M V2.0 (FM)	12
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Modulator Sound MSP-M
27432-803611678

1. General description

SOUND MODULATOR MSP-M V2.0

Electrical diagram: 80356 1986

Module "Modulator Sound Stereo MSP-M" is frequency modulator of IF sound carrier (SC1) with sound signals (AF1).

Technical characteristics meet standard ITU-R BT 472.

Sound Modulator working is combined with Vision Modulator. Generated frequencies are synchronised with video carrier frequency (38.9MHz).

Modulator is controlled by central processor unit (MCU) via internal bus I²C (SCL, SDA). Carriers SC1, Preemphasis are possible to switch on or off by setting in menu 1C:Sound Mod. Deviation of carrier SC1 is set by Gain SC1=0dB between limits -6dB to +20dB. 0dB corresponds to input level 6dBu.

The state of module is shown by means of three colour LED diodes on the front side of modulator.

Colour of the LED	Green	Red	Yellow
SC1 (LD1)	SC1=ON	SC1=OFF	Fault
Preemphasis (LD3)	Preemp.=ON	Preemp.=OFF	/

Carriers fault in the case of unlocked PLL loop is signalised on the MCU unit (F:Snd, C: PLL).

Modulator is able to normally work without of MCU unit. In this case all settings are set to position ON and gain of AF1 is set to 0dB.

2. Description of operation

Symmetrical audio input AF1 is connected to module connector X1 (pins C2,C3). Audio input impedance is set to 600 Ohms or 12 kOhms by means of jumpers JP1.

Gain of the input signal AF1 and consecutive the frequency deviation SC1 is set on the MCU unit (1C: Sound Mod. → Gain AF1).

Audio input signal level is displayed on the MCU unit. Display AF1 Level = 0dB represents 30 kHz frequency deviation SC1.

Audio input signal is then led to the preemphasis amplifier and low pass filter.

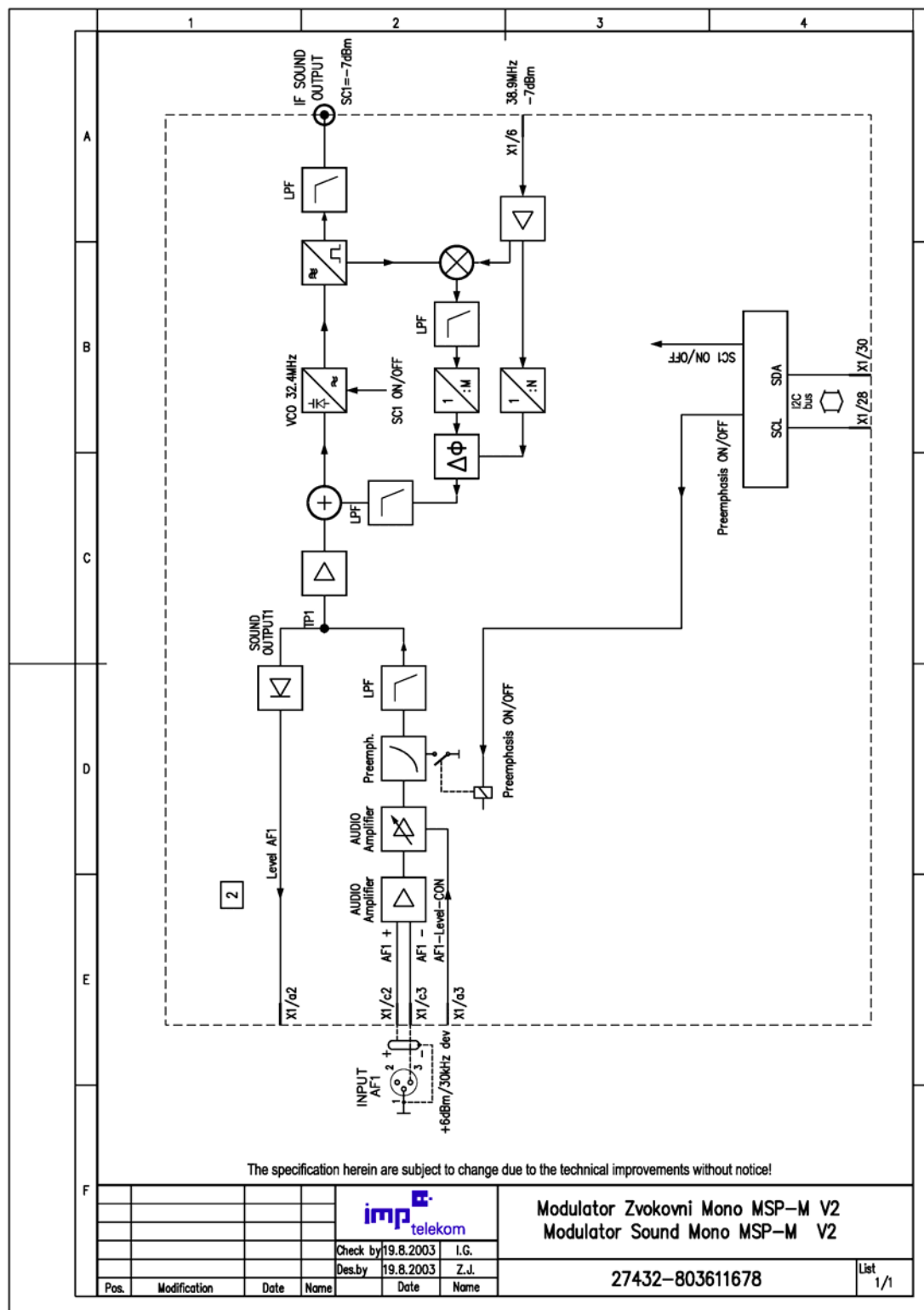
Output frequency of sound carrier SC1 is synchronized with frequency of oscillator of video modulator module. Input of video IF carrier signal (38.9 MHz) is on the connector X1/6.

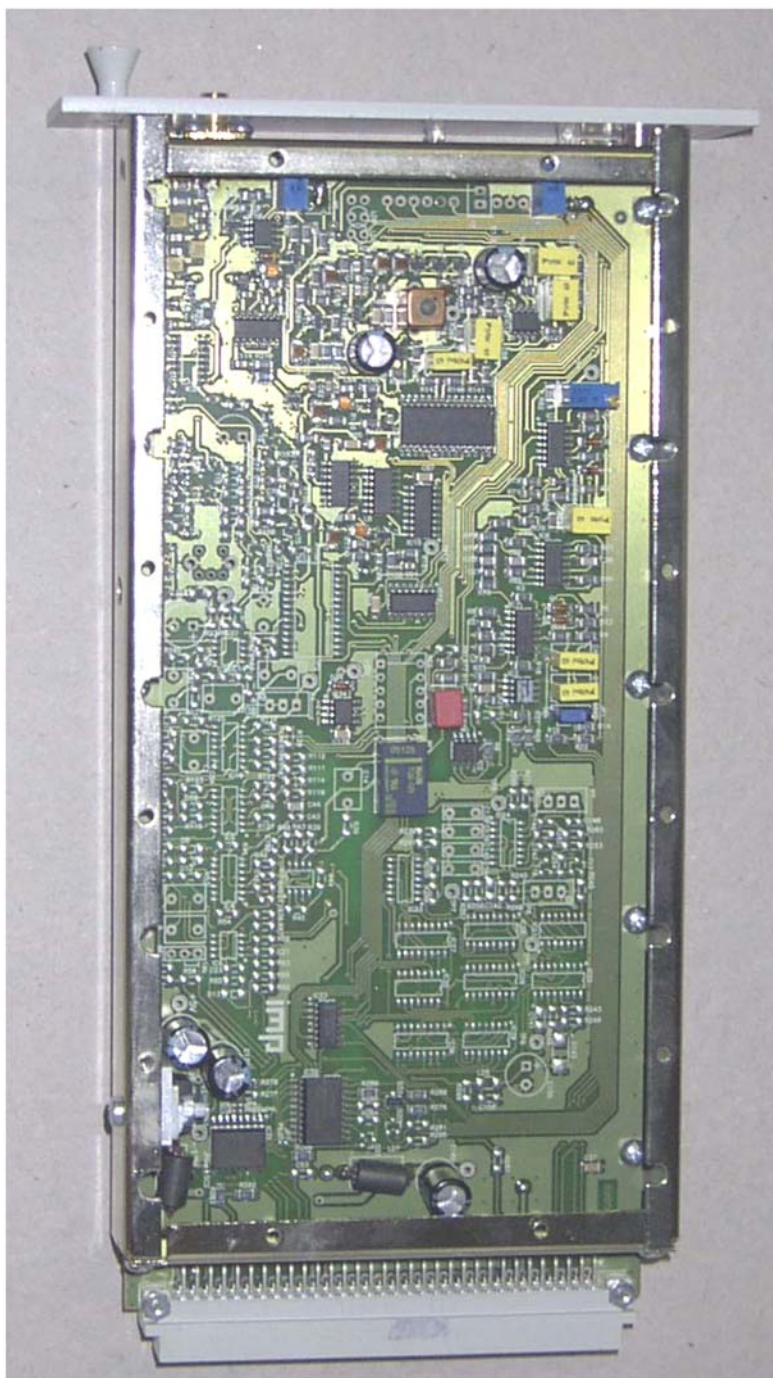
Amplitude of SC1 is set by potentiometer P6 (IF Level) on the front plate of module.

3. Technical data

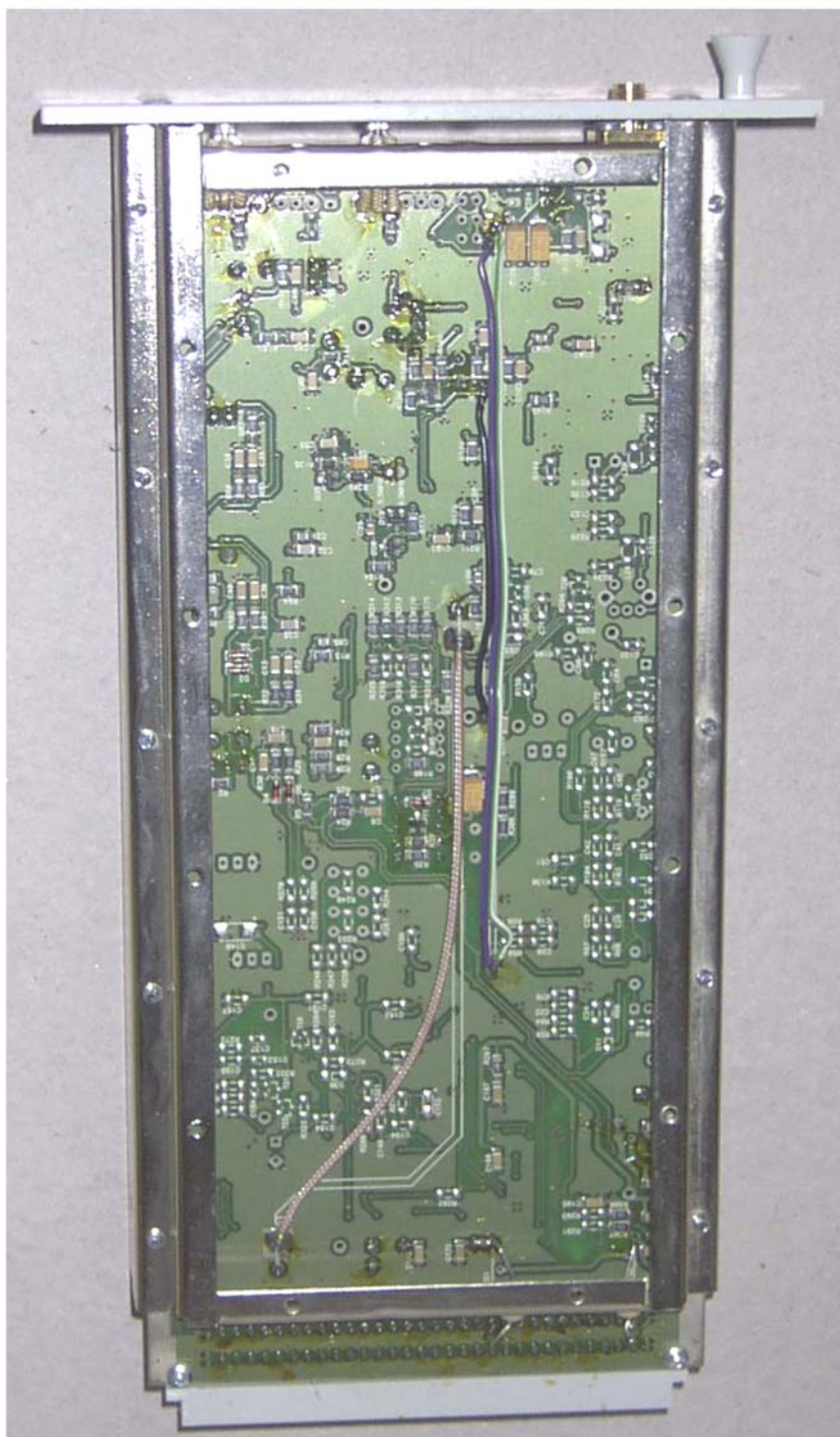
○ Output frequency	SC1 33.4MHz (32.4 MHz)
○ Output level	-7dBm (± 4 dB adjustable)
○ Output matching	> 20dB (50 Ohms)
○ Input audio level	-14dBu...+12dBu (6dBu =1.55Veff)
○ Input audio impedance	600 Ohms / 12k Ohms (adjustable)
○ Preemphasis	50 μ s
○ Nominal frequency deviation:	± 30 kHz (6dBu)
○ Max. frequency deviation	± 80 -90 kHz
○ AF amp./fre. characteristic:	$\pm < 0.2$ dB (without preemphasis)
	$\pm < 0.5$ dB (with preemphasis)
○ Harmonic distortions: ± 50 kHz	< 0.4%
± 70 kHz	< 0.8 %
○ Signal to noise ratio	> 66 dB (unweighted)
(0 dB = ± 30 kHz deviation)	> 70 dB (weighted)
○ Amplitude modulation	< 56 dB (sync ± 50 kHz deviation)

2. Block diagram





Modulator Sound MSP-M
27432-803611678

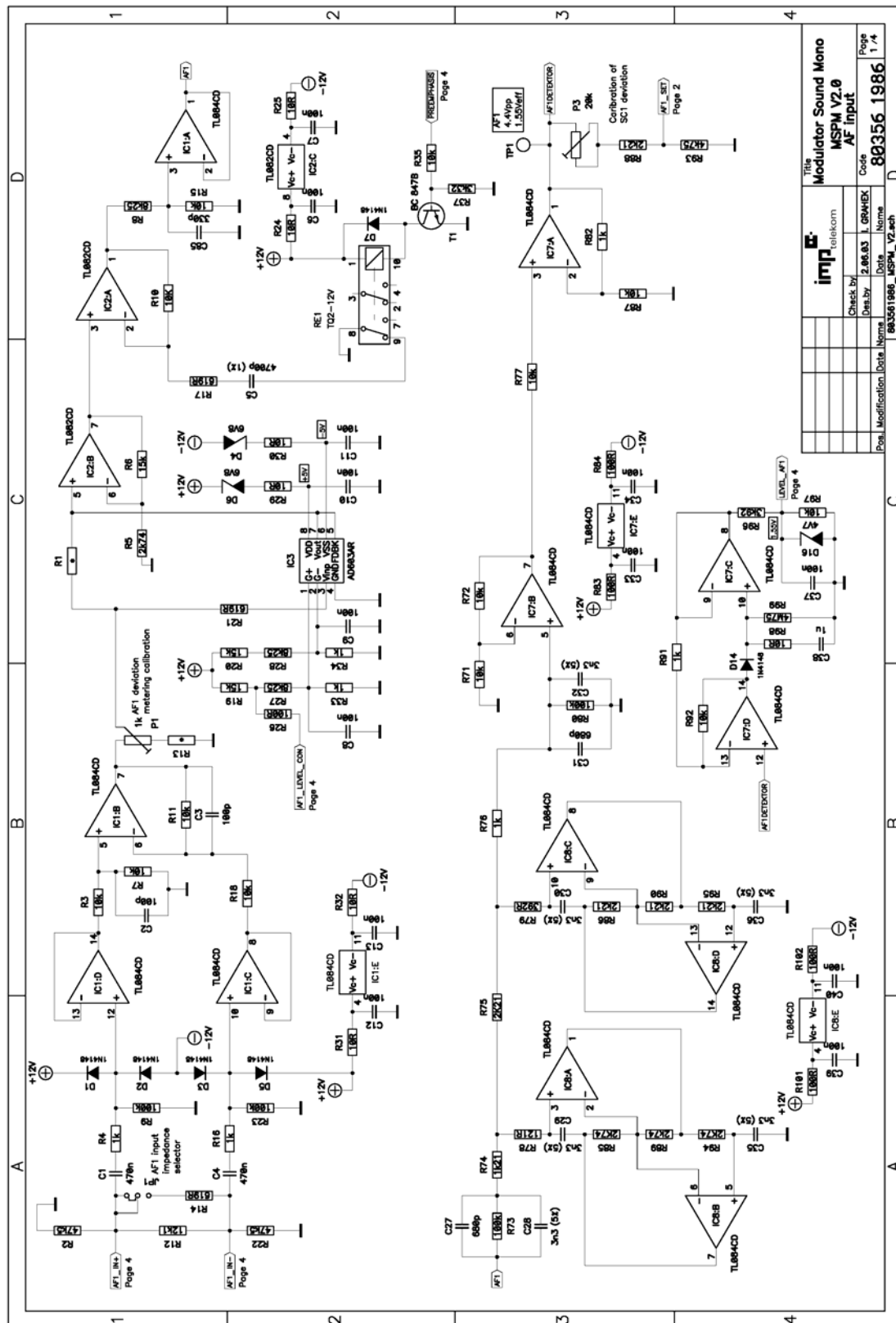


Modulator Sound MSP-M
27432-803611678

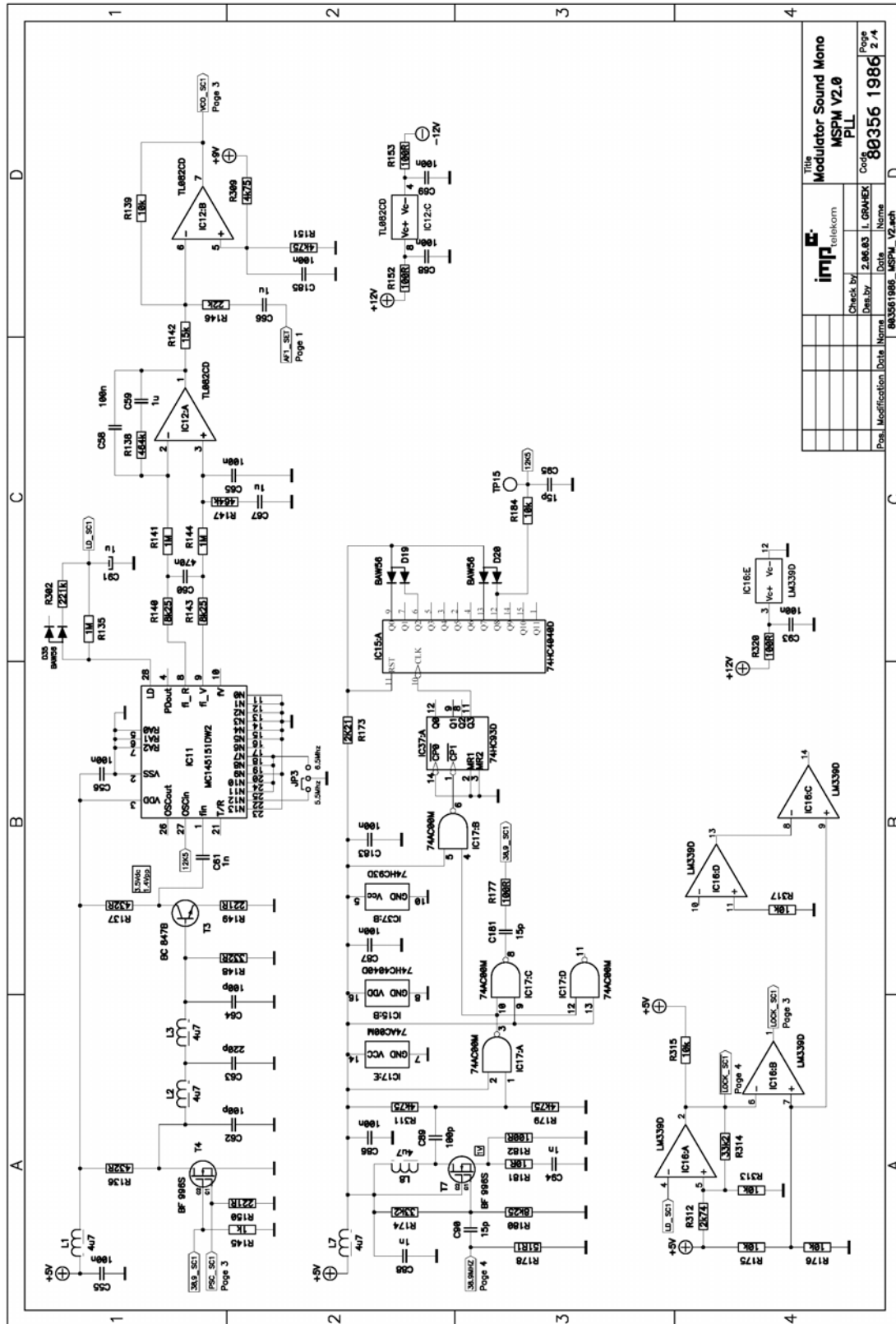
	Designation:	Stock No.	Page:		File:	
	MODULATOR SOUND MONO MSP-M V2.0	27432	Date:	31.8.2006	Disk:	
		803611678				

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5. Electrical diagram of MSP-M V2.0 (AF Input)

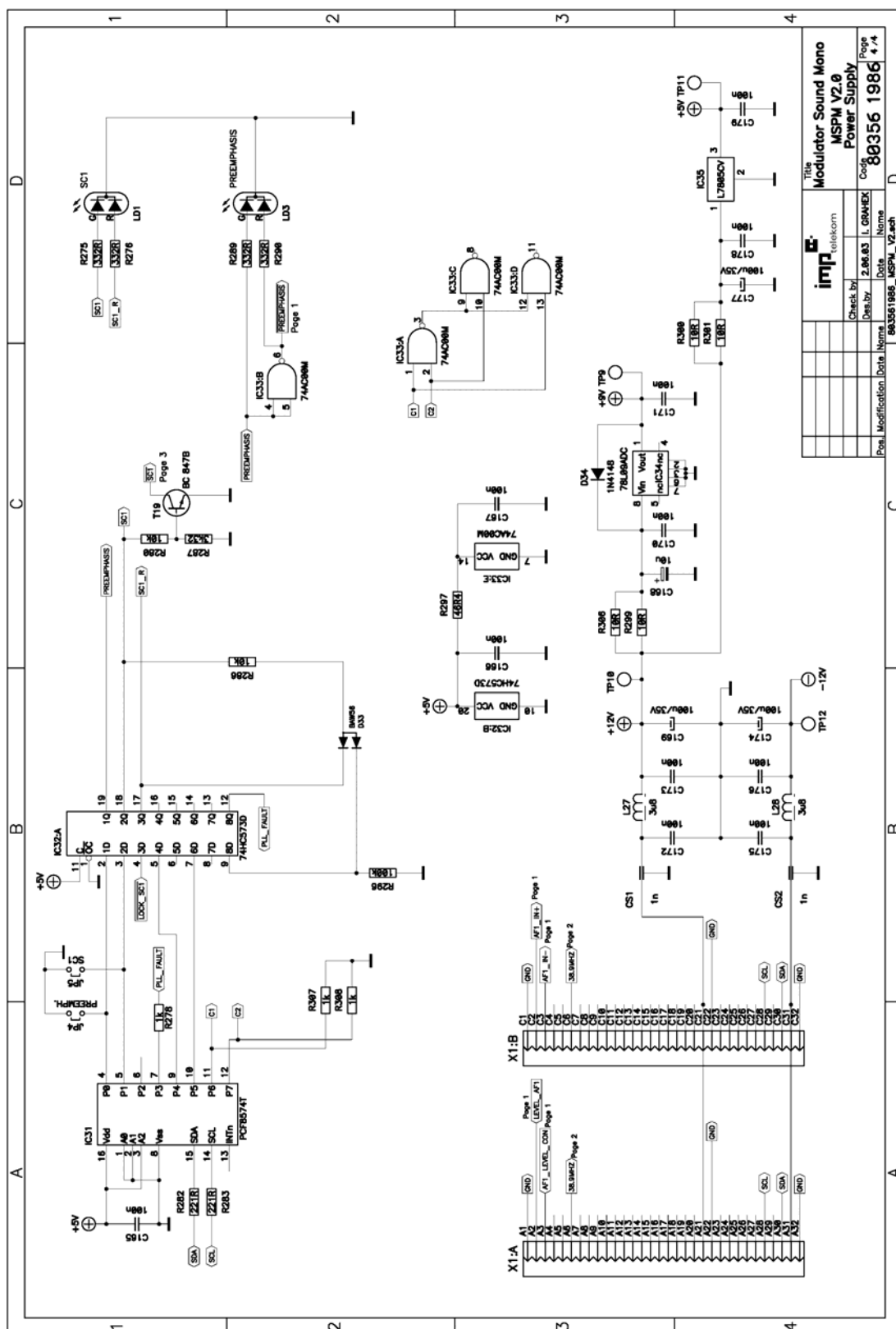


6. Electrical diagram of MSP-M V2.0 (PLL)

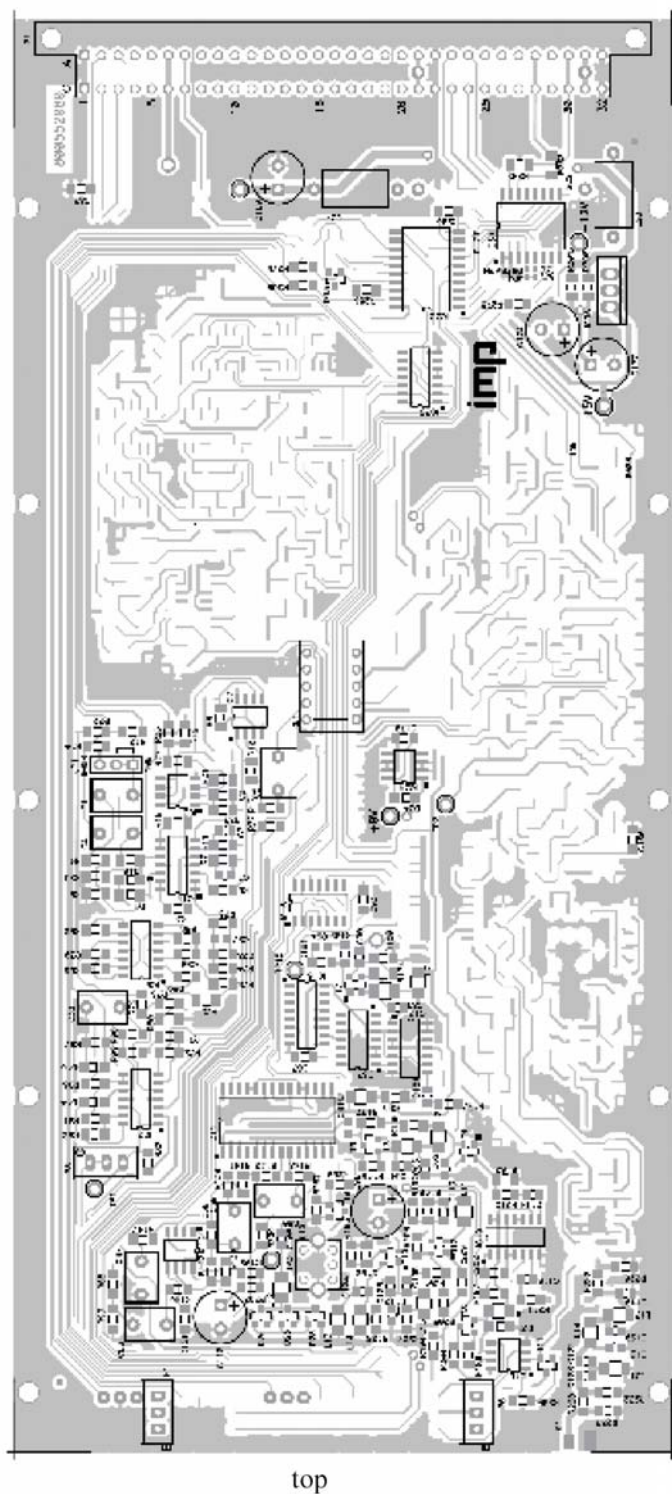


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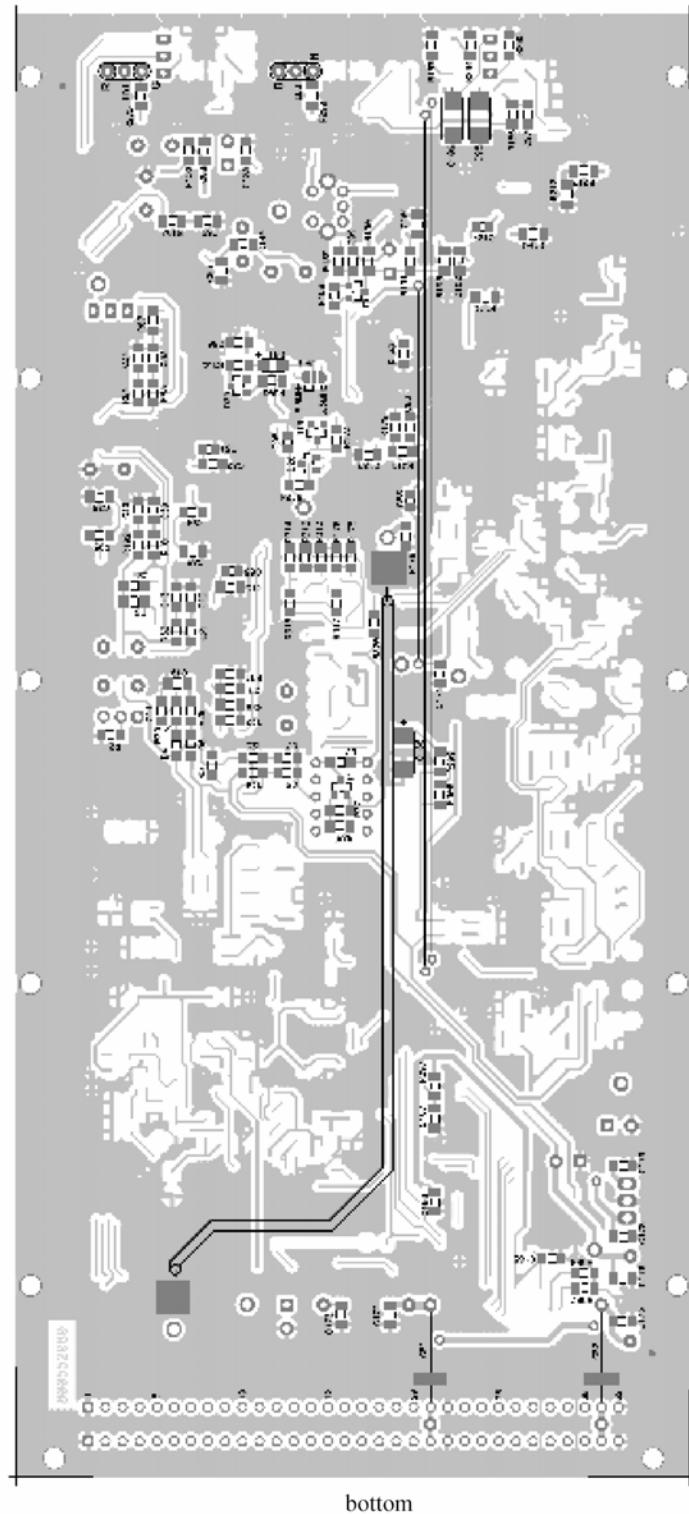
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9. PCB Sound Modulator MSP-M V2.0



TES MSP-M V2.0
PCB MSP-M V2.0
26420-803561986



TES MSP-M V2.0
PCB MSP-M V2.0
26420-803561986

10. Bill of material for PCB MSP-M V2.0

	Designation:	Stock No.	Page:		File:	
	PCB MODULATOR SOUND MONO MSP-M V2	26420	Date:	30.8.2006	Disk:	
		803561986				

No.	Pcs	Designation	Stock No.	Signature	Rem./Ven.
2	1	PCB MODULATOR SOUND MSP V1.0	18604-800552080		IMP
4	1	IC SMD 74HC93 SO14	6575-385075693	IC37	PHILIPS
6	3	IC SMD 74AC00M SO14	6592-385076740	IC17,IC19,IC33	ST
8	1	IC SMD 74HC573D SOT163-1	6588-385075873	IC32	PHILIPS
10	1	IC SMD 74HC4040D SO16	6584-385075840	IC15	PHILIPS
12	1	VOLTAGE REGUL. SMD LM 78L09 ACM SO-8	6599-385078008	IC34	NSC
14	1	IC AD 603 SO8	6915-385095009	IC3	AD
16	3	IC SMD TL 082 CD SO8	6499-385055082	IC2,IC12,IC18	ST
18	3	IC SMD TL 084 CD SO14	6500-385055084	IC1,IC7,IC8	ST
20	1	IC PLL MC 145151 DW2 SO28L	6866-385089024	IC11	MOTOROLA
22	1	IC PCF 8574 T SOT162-1	6888-385091047	IC31	PHILIPS
24	1	VOLTAGE REGUL. LM 7805 CT TO-220	6844-385088805	IC35	ST
26	1	IC SMD LM 339 D SO14	6503-385055339	IC16	IMP
28	5	TRANS SMD (NPN) BC 847B	6476-385046848	T1,T3,T8,T11,T19	PHILIPS
30	1	TRANS SMD (PNP) BC 857 B	6318-385010856	T9	PHILIPS
32	4	TRANS SMD BF 996 S	6492-385048996	T4,T7,T10,T12	INFINCON
34	1	DIODE ZENSMD BZ V55/C4V 4V7 SOD80	7014-385209047	D16	INFINCON
36	3	DIODE ZENSMD BZ V55/C6V 6V8 SOD80	7017-385209068	D4,D6,D22	INFINCON
38	4	DIODE SMD BAW56 SOT23	7179-385330256	D19,D20,D33,D35	PHILIPS
40	3	DIODE BB804 SOT23	7007-385201804	D23,D25,D26	PHILIPS
42	7	DIODE SMD LL4148 MELF	7167-385290148	D1,D2,D3,D5,D7,D14,D34	SEMIKRON
44	2	DIODE LED RED/GREEN F13MM L-93 WEGW	7119-385255039	LD1,LD3	IC D.O.O.
46	1	POT 20K 3296 W-1-203	7858-388906112	P3	BOURNS
48	1	POT 10K 3296-X-1-103	7828-388904001	P6	BOURNS
50	1	POT 1K 3296-X-1-102	7831-388904004	P1	BOURNS
52	1	CAP TANSMD 1UF 20V A M	6238-384650002	C91	KEMET
54	3	CAP TANSMD 10UF 16V C M	6244-384651009	C98,C109,C168	KEMET
56	5	CAP EL 100UF 35V 8X12 R3.5 M	5670-383400041	C96,C110,C169,C174,C177	ROEDESTEIN
58	4	CAP PL 1UF 63V 5X7.5 R5 K	5881-383929114	C38,C59,C66,C67	ROEDESTEIN
60	3	CAP PL 0.47UF 63V 5X7.5 R5 K	5867-383925147	C1,C4,C60	ISKRA
62	1	CAP PL. 4700PF 63V F R5 KP 1830-247	6079-384461748	C5	IC-ROEDEST.
64	6	CAP SMD 3,3NF 50V CG 1206 J	6210-384603331	C28,C29,C30,C32,C35,C36	YAGEO

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No.	Pcs	Designation	Stock No.	Signature	Rem./Ven.
66	42	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C6,C7,C8,C9,C10,C11,C12,C13,C33,C34,C37,C39,C40,C55,C56,C58,C65,C68,C69,C86,C87,C93,C97,C99,C100,C101,C102,C103,C113,C165,C166,C167,C170,C171,C172,C173,C175,C176,C178,C179,C183,C185	YAGEO
68	4	CAP SMD 1NF 50V CG 0805 K	6205-384603100	C61,C88,C94,C115	YAGEO
70	3	CAP SMD 680PF 50V CG 0805 J	6201-384602679	C27,C31,C108	YAGEO
72	1	CAP SMD 330PF 50V CG 0805 J	6195-384602331	C85	YAGEO
74	1	CAP SMD 220PF 50V CG 0805 K	6192-384602220	C63	YAGEO
76	4	CAP SMD 150PF 50V CG 0805 K	6190-384602150	C106,C112,C120,C121	YAGEO
78	6	CAP SMD 100PF 50V CG 0805 K	6186-384602100	C2,C3,C62,C64,C89,C107	YAGEO
80	1	CAP SMD 82PF 50V CG 0805 K	6185-384601820	C119	YAGEO
82	3	CAP SMD 47PF 50V CG 0805 K	6180-384601470	C104,C122,C128	YAGEO
84	5	CAP SMD 15PF 50V CG 0805 K	6173-384601150	C90,C95,C105,C114,C181	YAGEO
86	2	CHOKE FERITNA D6L 3C 3,8UH-02	5115-373980101	L27,L28	
88	3	COIL SMD 0,33UH B-82422 A3331	7569-387800033	L17,L18,L21	SIEMENS
90	11	COIL SIMID01 4.7UH B82412A1472	7570-387800470	L1,L2,L3,L7,L8,L9,L11,L12,L13,L14,L15	SIEMENS
92	1	COIL L7 VMM	22971-801500579	L10	IMP
94	1	RELAY TQ2-12V-MAT.12V 1A IC37503012	3956-317810131	RE1	MATSUSHITA
96	15	RESISTOR SMD 1K 1206 0,25W 1%	8856-393011100	R4,R16,R33,R34,R76,R82,R91,R145,R190,R192,R201,R203,R278,R307,R308	VITROHM
98	1	RESISTOR SMD 1K21 1206 0,25W 1%	8858-393011120	R74	VITROHM
100	6	RESISTOR SMD 2K21 1206 0,25W 1%	8868-393011220	R75,R86,R88,R90,R95,R173	VITROHM
102	5	RESISTOR SMD 2K74 1206 0,25W 1%	8870-393011270	R5,R85,R89,R94,R312	VITROHM
104	3	RESISTOR SMD 3K32 1206 0,25W 1%	8873-393011330	R37,R188,R287	VITROHM
106	1	RESISTOR SMD 3K92 1206 0,25W 1%	8876-393011390	R96	VITROHM
108	5	RESISTOR SMD 4K75 1206 0,25W 1%	8879-393011470	R93,R151,R179,R309,R311	VITROHM
110	1	RESISTOR SMD 4M75 1206 0,25W 1%	8942-393014470	R99	VITROHM
112	8	RESISTOR SMD 8K25 1206 0,25W 1%	8886-393011820	R8,R27,R28,R140,R143,R180,R194,R199	VITROHM
114	29	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R3,R7,R10,R11,R15,R18,R35,R71,R72,R77,R87,R92,R97,R139,R175,R176,R184,R186,R189,R195,R196,R197,R200,R202,R280,R286,R313,R315,R317	VITROHM

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		803561986				

No.	Pcs	Designation	Stock No.	Signature	Rem./Ven.
116	13	RESISTOR SMD 10R 1206 0,25W 1%	8677-392021100	R24,R25,R29,R30,R31, R32,R98,R181,R213, R299,R300,R301,R306	VITROHM
118	3	RESISTOR SMD 12K1 1206 0,25W 1%	8892-393012121	R12,R205,R208	VITROHM
120	4	RESISTOR SMD 15K 1206 0,25W 1%	8894-393012150	R6,R19,R20,R142	VITROHM
122	1	RESISTOR SMD 17R8 1206 0,25W 1%	8822-393010018	R228	VITROHM
124	2	RESISTOR SMD 33K2 1206 0,25W 1%	8905-393012332	R174,R314	VITROHM
126	1	RESISTOR SMD 46R4 1206 0,25W 1%	8828-393010046	R297	VITROHM
128	3	RESISTOR SMD 47K5 1206 0,25W 1%	8765-392024475	R2,R22,R198	VITROHM
130	3	RESISTOR SMD 51R1 1206 0,25W 1%	8691-392021511	R178,R222,R226	VITROHM
132	1	RESISTOR SMD 75R0 1206 0,25W 1%	8830-393010075	R304	VITROHM
134	7	RESISTOR SMD 100K 1206 0,25W 1%	8914-393013100	R9,R23,R73,R80,R187, R204,R296	VITROHM
136	14	RESISTOR SMD 100R 1206 0,25W 1%	8833-393010100	R26,R83,R84,R101,R102, R152,R153,R177,R182, R185,R191,R193,R212, R320	VITROHM
138	1	RESISTOR SMD 121R 1206 0,25W 1%	8835-393010120	R78	VITROHM
140	1	RESISTOR SMD 221K 1206 0,25W 1%	8922-393013221	R302	VITROHM
142	6	RESISTOR SMD 221R 1206 0,25W 1%	8839-393010220	R149,R150,R207,R209, R282,R283	VITROHM
144	2	RESISTOR SMD 301R 1206 0,25W 1%	8844-393010300	R232,R233	VITROHM
146	5	RESISTOR SMD 332R 1206 0,25W 1%	8710-392022332	R148,R275,R276,R289, R290	VITROHM
148	1	RESISTOR SMD 392R 1206 0,25W 1%	8846-393010390	R79	VITROHM
150	4	RESISTOR SMD 432R 1206 0,25W 1%	8848-393010430	R136,R137,R206,R210	VITROHM
152	2	RESISTOR SMD 464K 1206 0,25W 1%	8780-392025464	R138,R147	VITROHM
154	3	RESISTOR SMD 619R 1206 0,25W 1%	8718-392022620	R14,R17,R21	VITROHM
156	1	RESISTOR SMD 180R 1206 0,25W 1%	8837-393010180	R211	VITROHM
158	1	RESISTOR SMD 22K 1206 0,25W 1%	8899-393012220	R146	VITROHM
160	3	RESISTOR SMD 1M 1206 0,25W 1%	8784-392026100	R135,R141,R144	VITROHM
162	1	SHORT CIRCUIT JUMPER CAB4 R=2.54	8082-389210235	JP1	
164	0.10	SQUARE-PIN 1-ROW 36-P M2.54 SL11/112G36	4657-373908151	JP1	
170	1	CONNECTOR ANGLE 64-P (M) STV-C-64-M-AC	4795-373908368	X1	ERNI
172	1	SQUARE-PIN KODIRNA M 083 502 ERNI	4794-373908367		ERNI

3.3 Vision Modulator MVP V2.0

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Modulator Vision MVP



MODULATOR VISION MVP

El. diagram: 80356 2021

1. General description

The MODULATOR VISION MVP is an amplitude modulator of IF video carrier (VC) with video signal. The unit complies with technical standards ITU-R BT 472. It can be built according to either PAL or SECAM standards.

Video modulator MVP consists of following subunits:

- a) Video input level control: auto or manual. Auto mode is possible only when the line 17 (or 18) is present.
- b) Sinchro pulse regeneration
- c) White level limiter
- d) Group delay precorrection
- e) DC black level restoration and modulation depth setting
- f) Amplitude modulator
- g) Oscillator 38.9 MHz with external frequency reference
- h) SAW filter
- i) IF amplifier with level control

Subunits are controlled by Microcontroller Unit where the basic settings and measurements are available.

On the front plate led diodes are signallise:

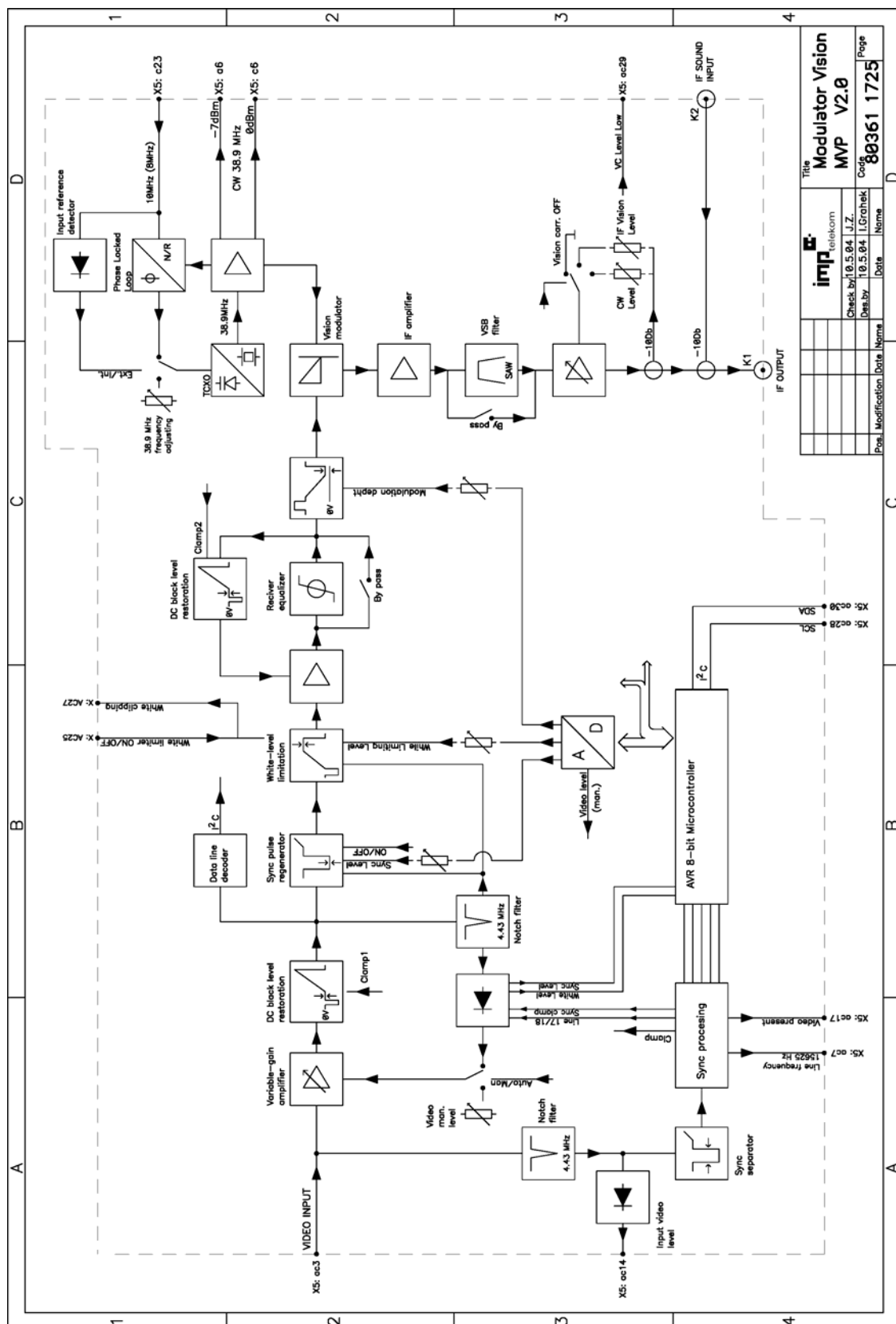
	Green	Red	Orange – yellow
White limiter	ON	OFF	White level exceeded
Input level regulation	Auto mode	Manual mode	Line 17/18 not present
Sinchro regenerator	ON	OFF	Fault

2. Technical data

Nominal video input	1Vpp ± 6dB
Input matching	> 34dB (75 Ω)
Output level	100mVrms
Video carrier frequency	38900000 Hz
Frequency stability: long-term	+/- 1 ppm (1 year) – without external ref. frequency

Temperature stability of freq : -30 + 75 °C	+ - 2.5 ppm – without external ref. frequency
Amplitude/frequency characteristic	< +- 0.2 dB
Signal to noise ratio	> 60 dB _{eff} (200kHz...5MHz)
Current consumption of module: + 12 V - 12 V	450 mA 200 mA

3. Block diagram



MOD.VISION

- ☐ WHITE LIMITER
- ☐ VIDEO AGC
- ☐ SYNC.REGEN.
- ☒ IF OUTPUT
- ☒ IF SOUND INPUT

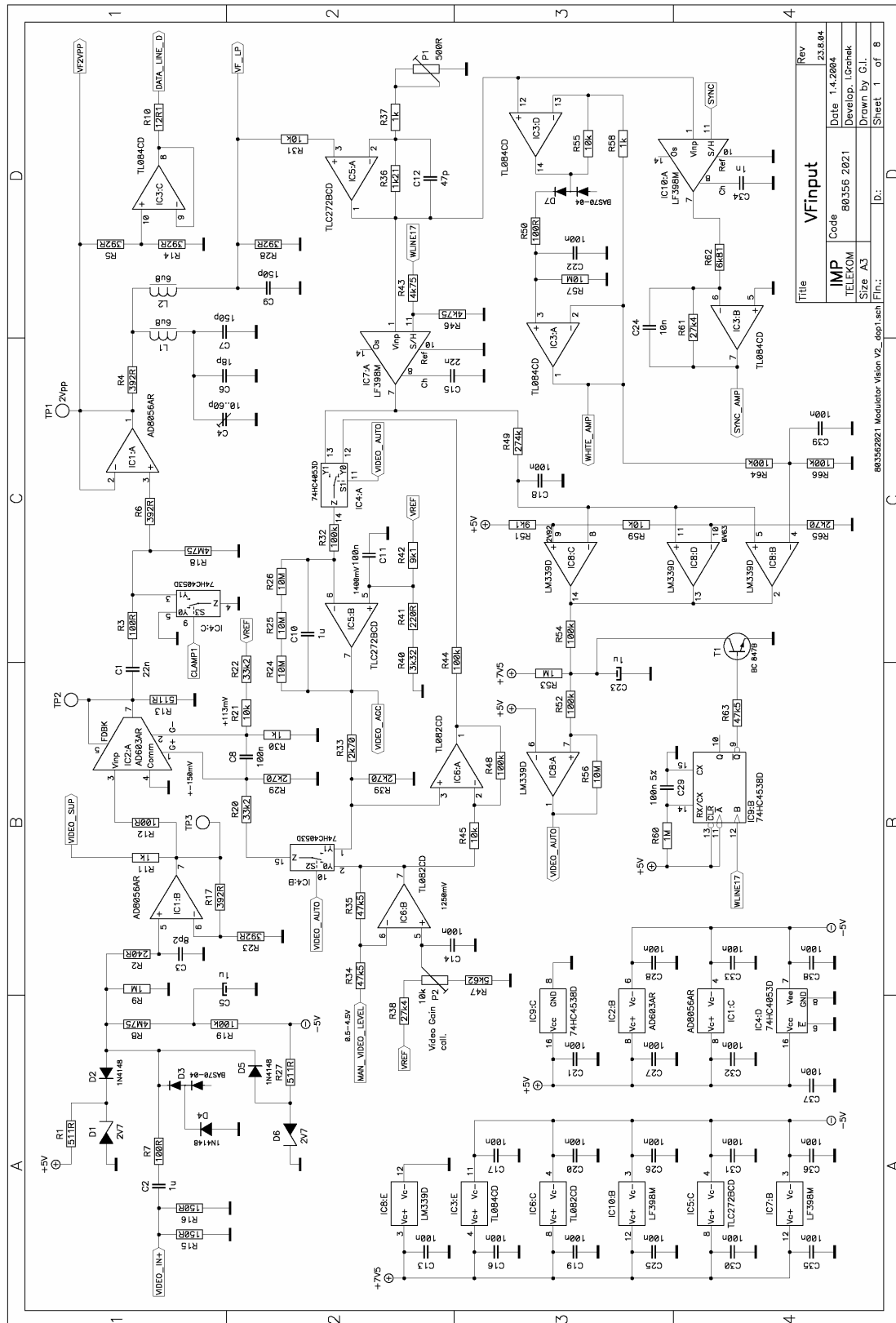


MODULATOR VISION MVP
31171-803611725

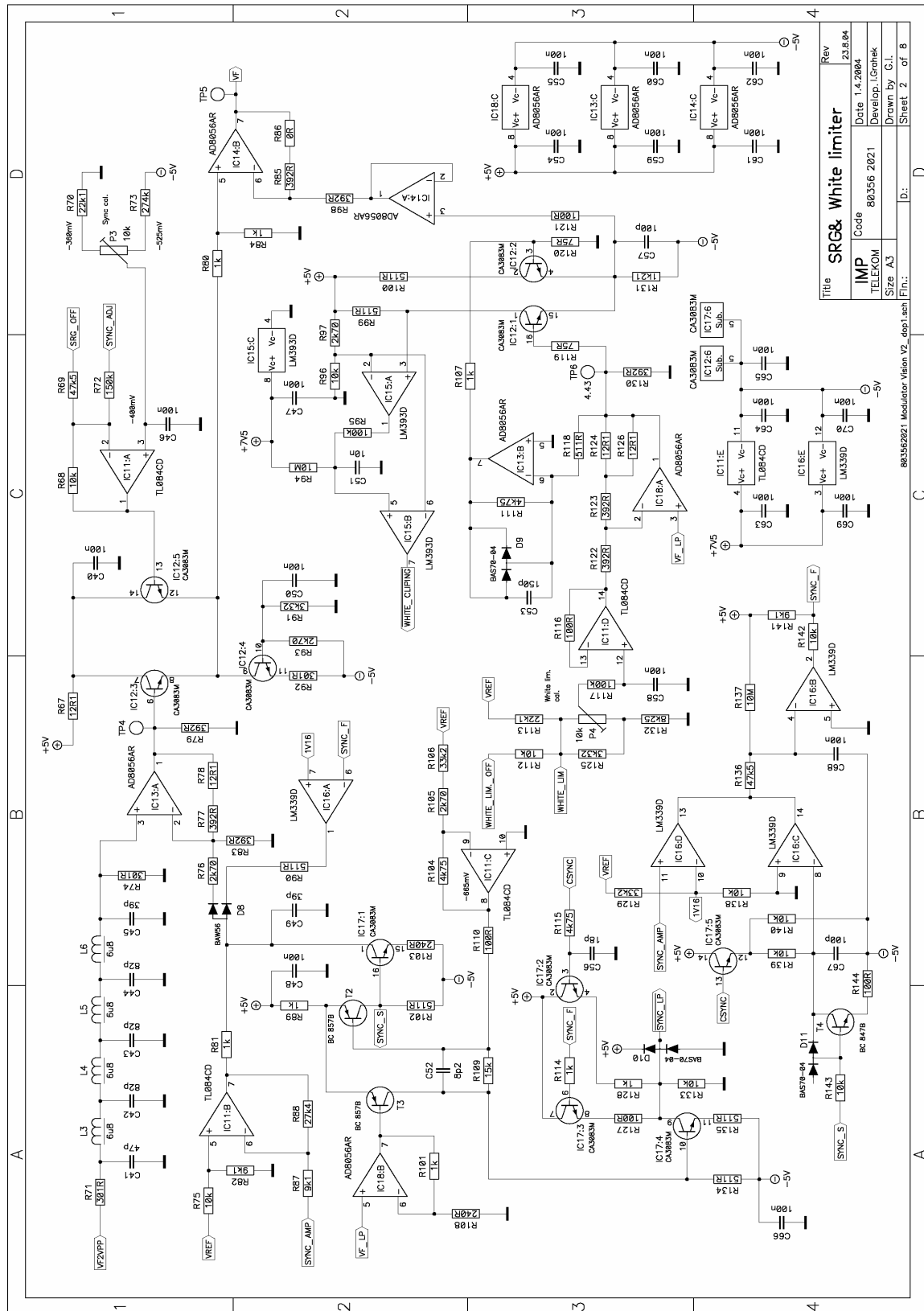
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	MODULATOR VISION MVP V2	803611725	Date:	6.4.04	Disk:	

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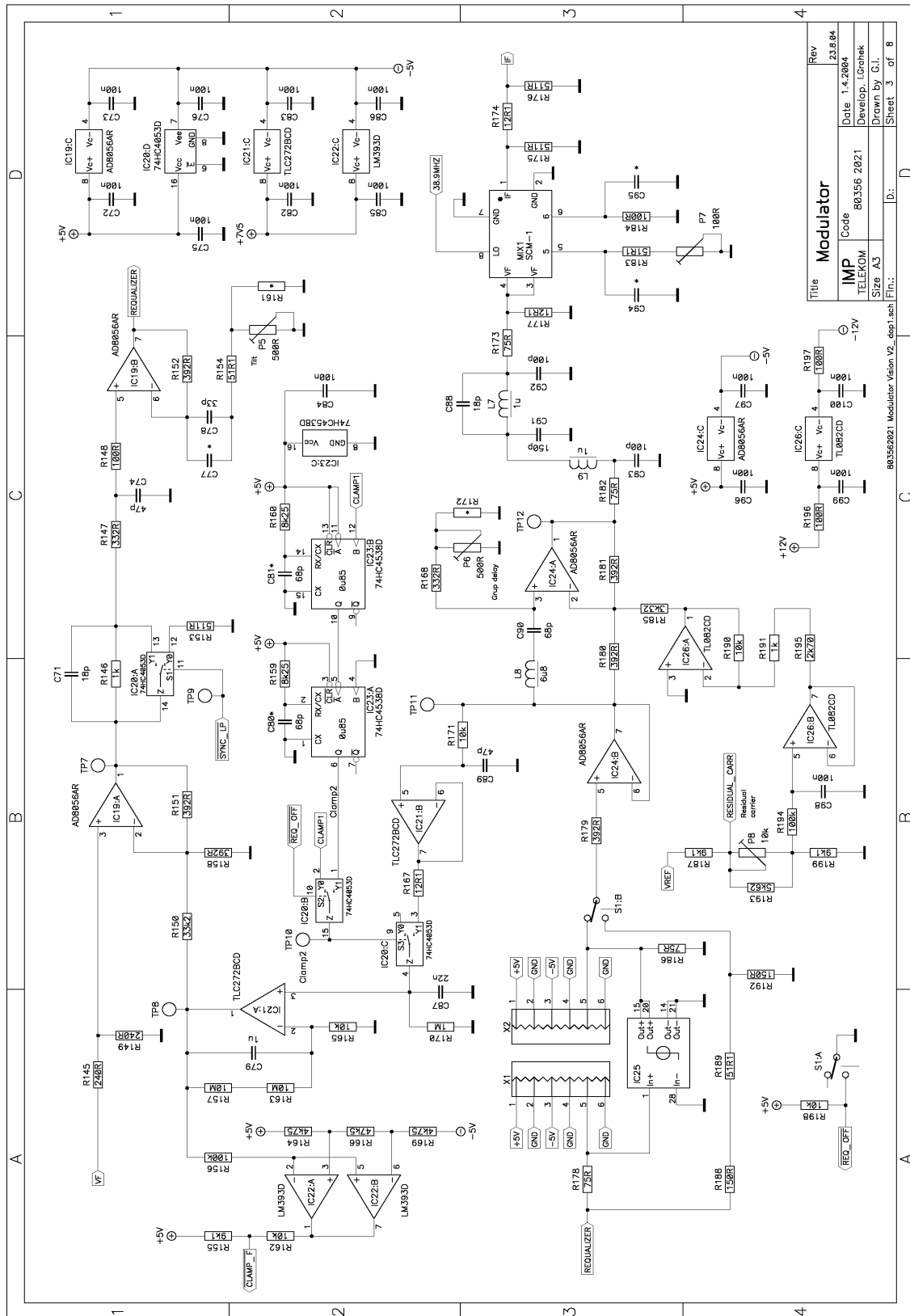
6. Electrical diagram for MVP (VF input)



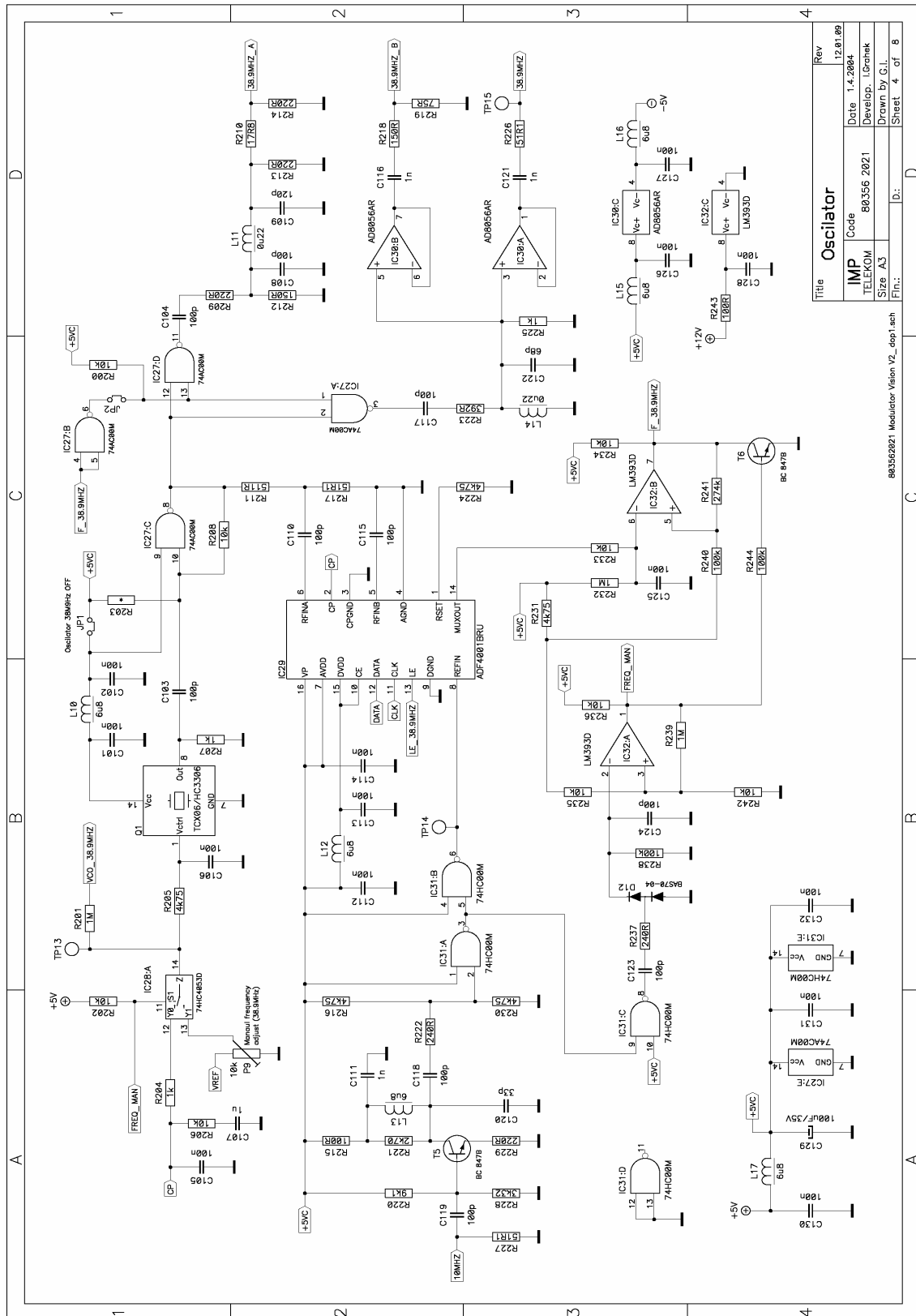
7. Electrical diagram for MVP (SRG & White limiter)



8. Electrical diagram for MVP (Modulator)



9. Electrical diagram for MVP (Oscillator)



8035562821 Modulator Vesion V2...dopt.sch

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Rev 23.8.04

Date 1.4.2004

Code 80356 2021

IMP TELEKOM

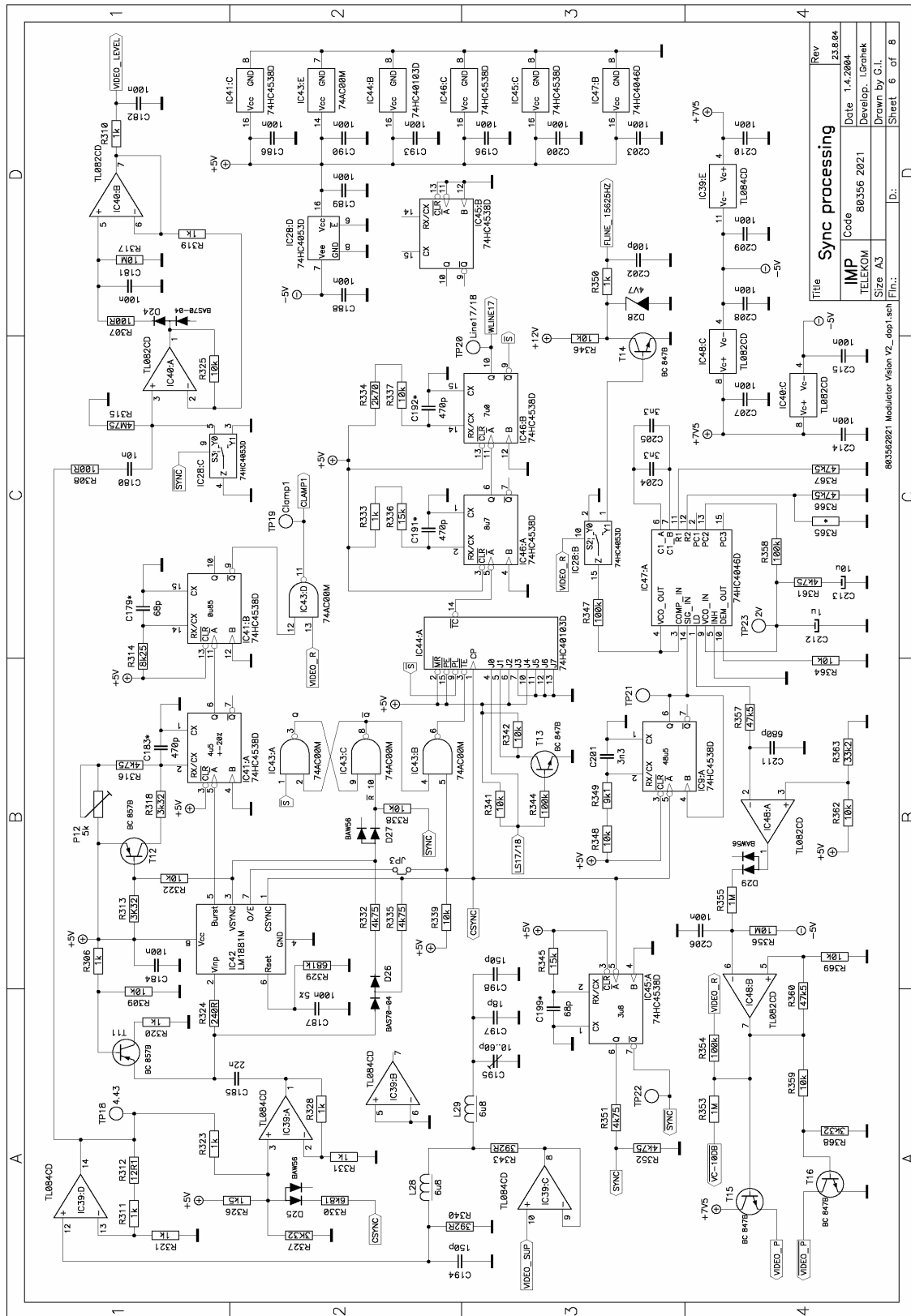
Develop. I.Grohnk

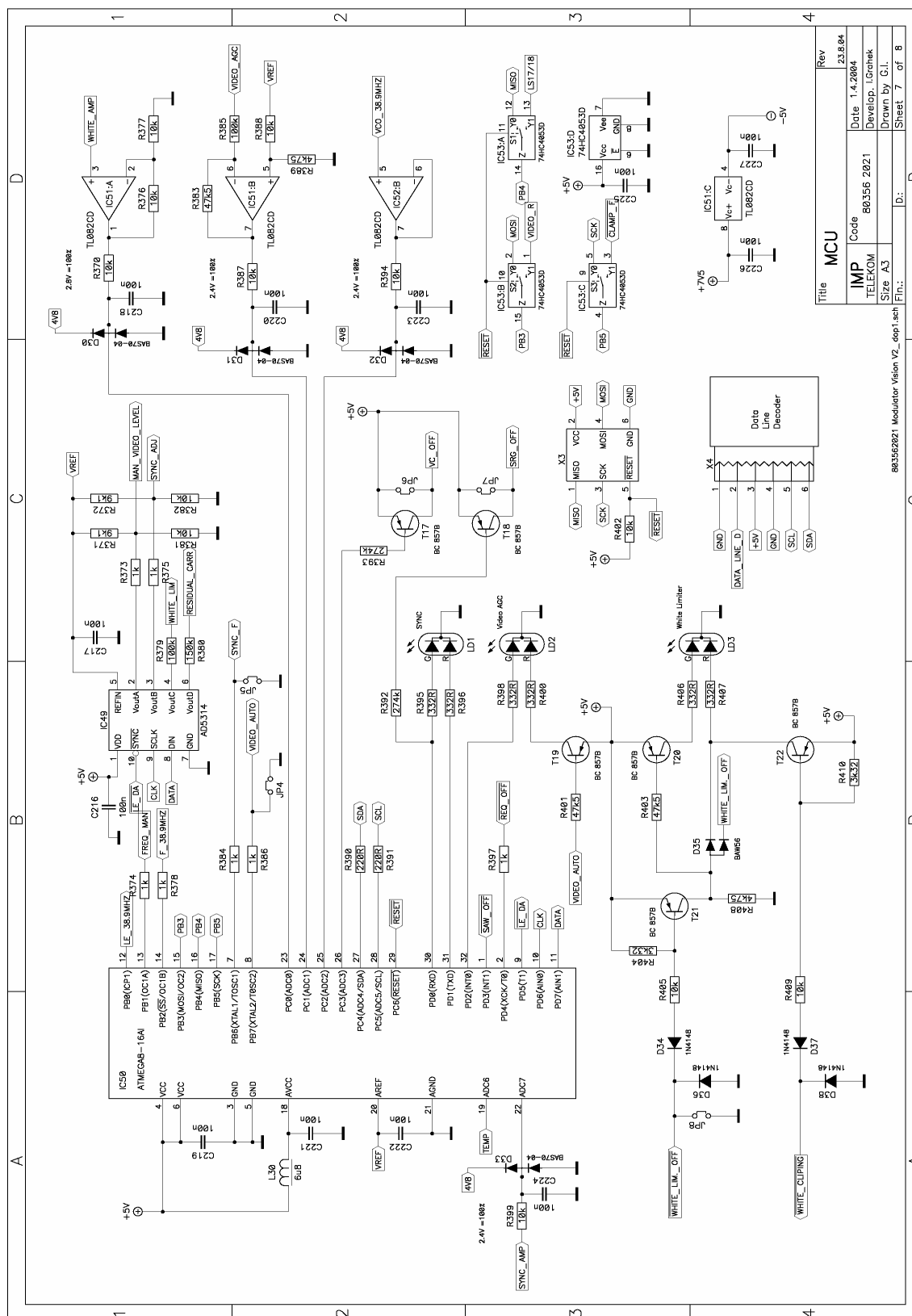
Size A3

Drawn by G.L.

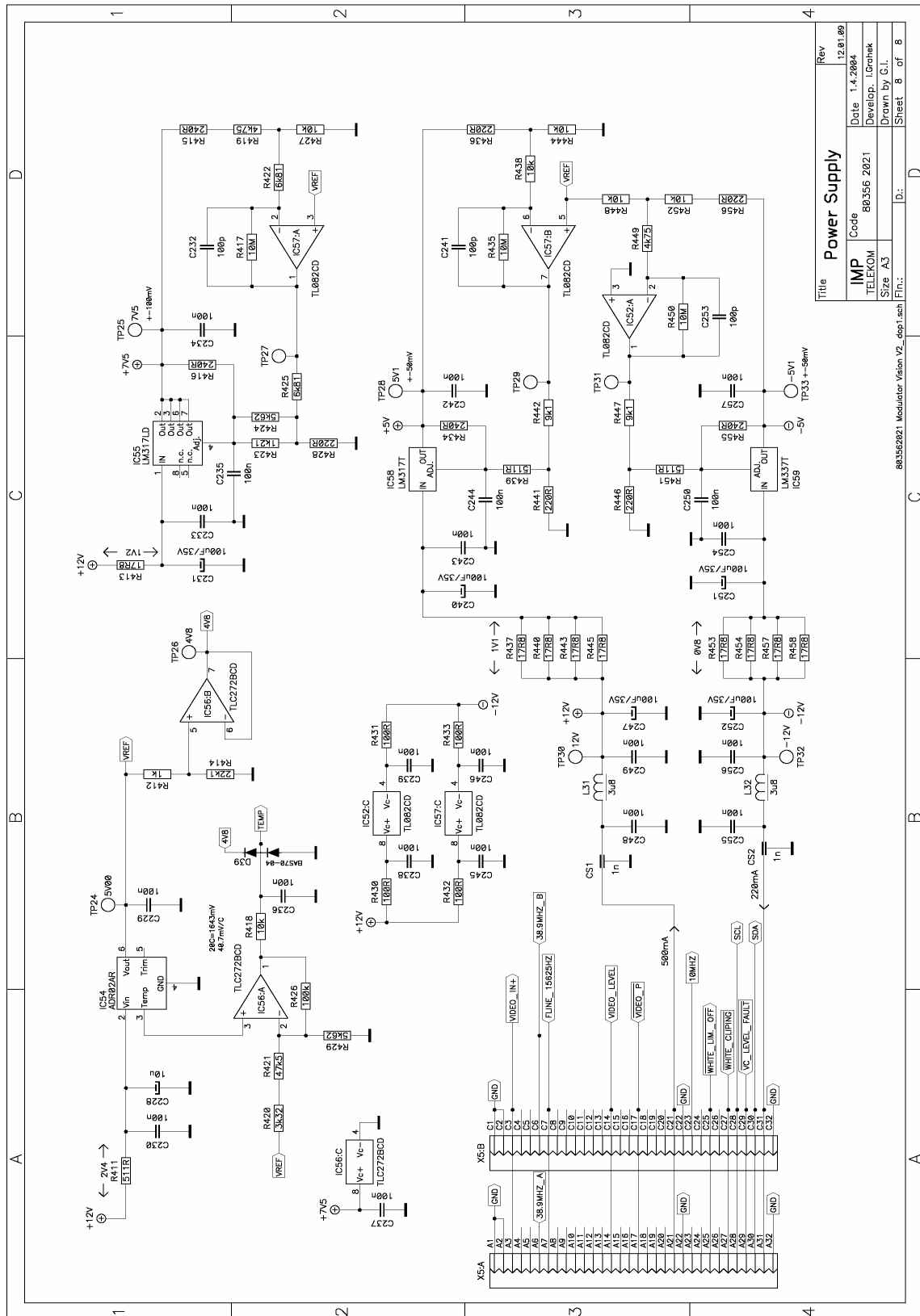
Fin.: D.: Title IF

11. Electrical diagram for MVP (Sync processing)

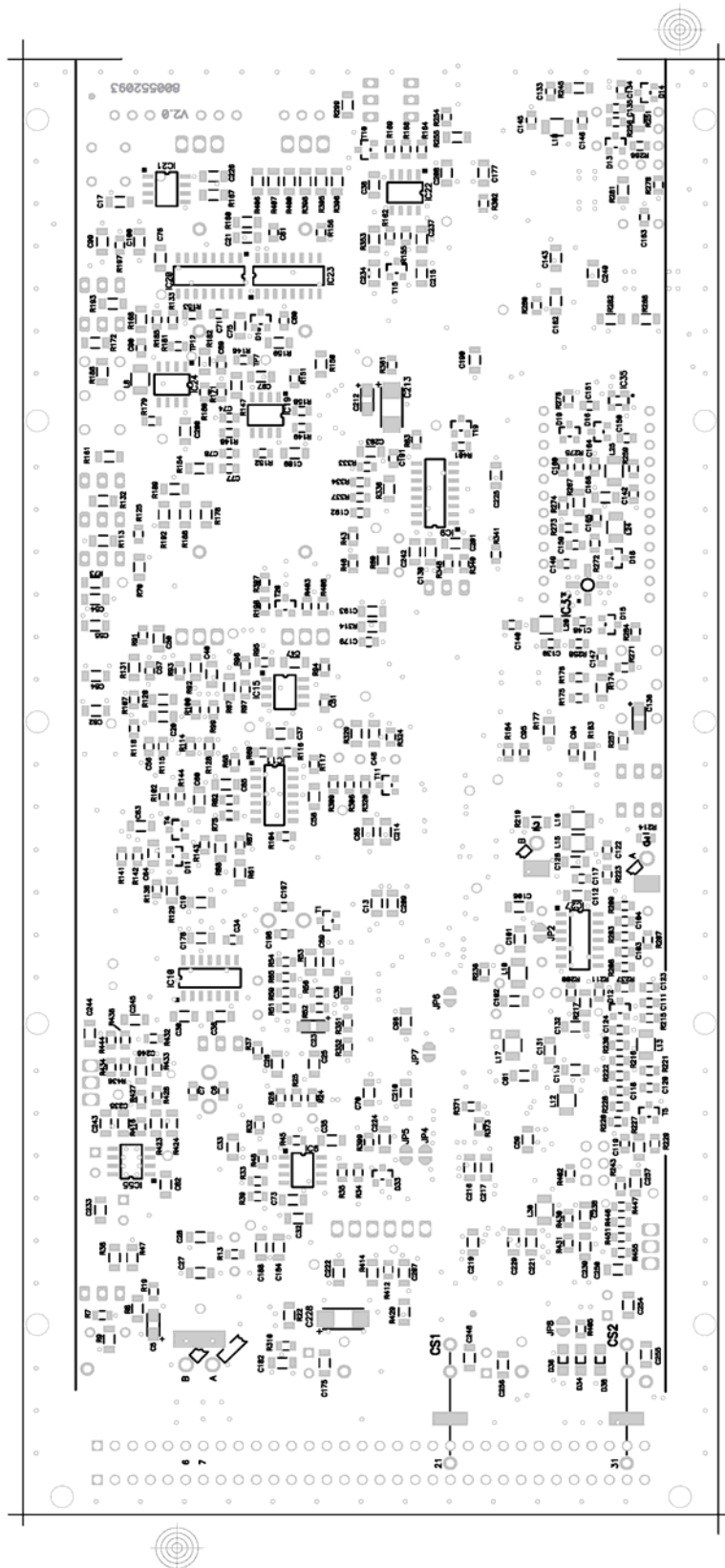


15

13. Electrical diagram for MVP (Power Supply)



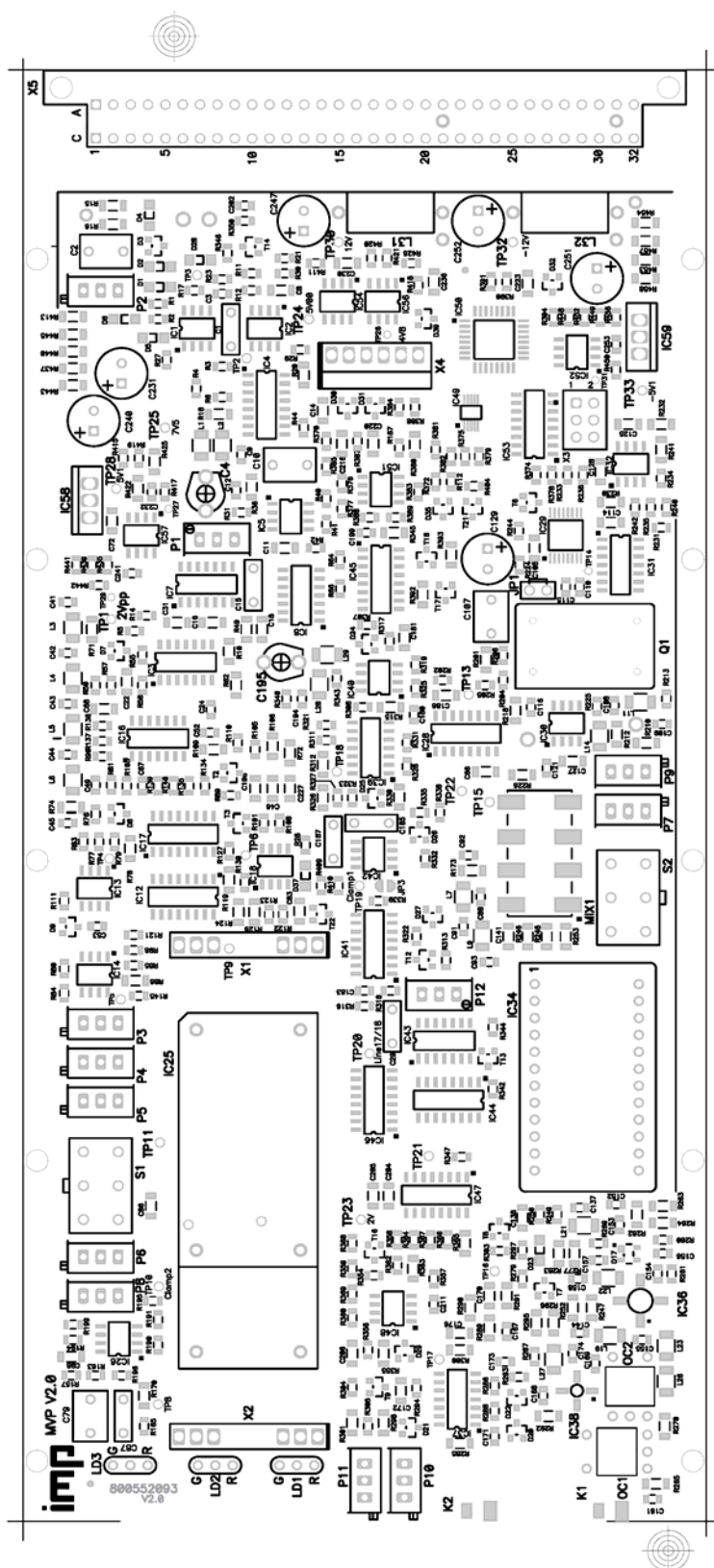
14. PCB for MVP



BOTTOM SILK 800552093

PCB Vision
Modulator V2.0

80356 2021



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Modulator V2.0
80356 2021

15. Bill of material for PCB MVP

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No.	Pcs.	Designation:	Stock No.:	Alt	Signature	Rem./Ven.
1	1	PCB MODULATOR VISION MVP V2	800552093			IMP
5	1	VIDEO SEPARATOR SMD LM1881M	385091033		IC42	NSC
6	3	IC SMD COMPARATOR LM 393 D	385055393		IC15,IC22,IC32	PHILIPS
8	3	IC PREC. OP. AMP. TLC 272 BCD	385083272		IC5,IC21,IC56	TI
9	7	OP. AMP. SMD TL 082 CD	385055082		IC6,IC26,IC40,IC48,IC51,IC52,IC57	TI
10	4	OP. AMP. SMD TL 084 CD	385055084		IC3,IC11,IC37,IC39	TI
11	7	IC VIDEO OP. AMP. AD 8056 AR	385095008		IC1,IC13,IC14,IC18,IC19,IC24,IC30	AD
12	1	IC VAR GAIN OP AMP AD 603 AR	385095009		IC2	AD
13	1	IC D/A CONV. AD 5314 BRM	385095021		IC49	AD
14	1	IC PLL ADF4001 BRU	385088251		IC29	AD
15	2	IC SMD 4X2 NAND 74AC00M	385076740		IC27,IC43	PHILIPS
16	1	IC SMD 4X2 NAND 74HC00D SO-14	385075600		IC31	ST
17	1	IC SMD PLL 74HC4046D	385075846		IC47	PHILIPS
19	4	IC SMD 74HC4053D	385075821		IC4,IC20,IC28,IC53	PHILIPS
20	5	IC DUAL RETRIG MONO MVB 74HC4538D	385076538		IC9,IC23,IC41,IC45,IC46	PHILIPS
21	1	IC SMD 8-BIT S.D.COUNTER 74HC40103	385075703		IC44	PHILIPS
24	1	IC VOLT. REF. ADR02 AR	385088254		IC54	AD
25	2	IC SMD TRANSISTOR ARRAY CA 3083 M	385083083		IC12,IC17	RCA
26	2	IC SMD SAMPLE/HOLD LF 398 M	385083398		IC7,IC10	MOTOROLA
27	2	IC SMD LM 339 D	385055339		IC8,IC16	PHILIPS
28	1	VOLTAGE REGUL. LM 317 LM	385083318		IC55	NSC
29	1	VOLTAGE REGUL. LM 317 T	385083317		IC58	NSC
30	1	VOLTAGE REGUL. LM 337 T	385083337		IC59	NSC
31	1	IC MICROCONTROLLER ATMEGA8-16AI	385078443		IC50	ATMEL
32	1	MMIC AMPLIFIER MAV-11 SM	385086012		IC36	MINI CIRCUITS
33	1	MMIC AMPLIFIER HIBRID VAM 6	385086600		IC35	MINI CIRCUITS
35	1	RF MIXER SMD DC-500MHZ SCM-1	385086016		MIX1	MINI CIRCUITS
36	2	MMIC AMPL. SMD HIBRID ERA-5 SM	385086605		IC33,IC38	MINI CIRCUITS
40	11	TRANSISTOR SMD (NPN) BC 847B	385046848		T1,T4,T5,T6,T7,T8,T9,T13,T14,T15,T16	PHILIPS
41	11	TRANSISTOR SMD (PNP) BC 857 B	385010856		T2,T3,T10,T11,T12,T17,T18,T19,T20,T21,T22	PHILIPS
44	7	DIODE SMD (MELF) 1N 4148	385290148		D2,D4,D5,D34,D36,D37,D38	INFINEON
45	1	PIN DIODE REGULATOR SMD BAR 61	385300061		D17	INFINEON
46	2	DIODE SMD BAT 17 Q62702-A504	385310017		D20,D22	INFINEON
47	6	DIODE SMD BAT 18	385310018		D13,D14,D15,D16,D18,D19	INFINEON
48	6	DIODE SMD BAW 56	385330256		D8,D21,D25,D27,D29,D35	PHILIPS

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49	13	DIODE SMD BAS 70-04	385330004		D3,D7,D9,D10,D11,D12,D24,D26,D30,D31,D32,D33,D39	INFINEON
51	2	DIODE ZENER SMD SOD80 2V7 BZV55/C2V7	385209027		D1,D6	PHILIPS
52	2	DIODE ZENER SMD SOD80 4V7 BZV55/C4V7	385209047		D23,D28	PHILIPS
55	3	DIODE LED RD/ZE, FI 3MM L-93 WEGW	385255039		LD1,LD2,LD3	KINGBRIGD
59	1	FILTER SAW SF0036BA01033T (38.9MHZ B/G)	389086102	1	IC34	MICRO NET.
59	1	FILTER SAW SF0036BA01072T (38.9MHZ)	389083534	2	IC34	MICRO NET.
60	1	IC FCS 530 HOUSING (F)	385085530	1	IC25	FARADAY
60	1	IC FCS 903 HOUSING (S)	385085903	2	IC25	FARADAY
61	1	OSCILATOR KVARC TCXO-6 38,9MHZ HC3306M	389051118		Q1	HC ELECTRON
64	1	POTENC. 3296 W-1-502 5K	388906113		P12	BOURNS
65	1	POTENC. 3296-X-1-104 100K	388904002		P10	BOURNS
66	6	POTENC. 3296-X-1-103 10K	388904001		P2,P3,P4,P8,P9,P11	BOURNS
67	2	POTENC. 3296-X-1-501 500 R	388904007		P5,P6	BOURNS
68	1	POTENC. 3296 W-1-501 500 R	388906115		P1	BOURNS
69	1	POTENC. 3296-X-1-101 100 R	388904009		P7	BOURNS
72	2	CAP. TRIM. TZ 03 P 600 9,8-60PF 100V	384533107		C4,C195	MURATA
78	6	ELKO 100UF 35V M R3.5 8X12 RD	383400041		C129,C231,C240,C247,C251,C252	ROEDERSTEIN
79	4	ELTAN 1UF 20V M SMD A	384650002		C5,C23,C136,C212	KEMET
80	2	ELTAN 10UF 16V M SMD C	384651009		C213,C228	KEMET
81	4	CAP. PL. 1UF 63V K R5 5X7,5 RD	383929114		C2,C10,C79,C107	ROEDERSTEIN
82	2	CAP. PL. 0.1UF 63V J 5% R5 2.5X7.5 RD	383925101		C29,C187	ISKRA
86	133	CAP. SMD X7R 1206 104 M 63V 100NF	384605101		C8,C11,C13,C14,C16,C17,C18,C19,C20,C21,C22,C25,C26,C27,C28,C30,C31,C32,C33,C35,C36,C37,C38,C39,C40,C46,C47,C48,C50,C54,C55,C58,C59,C60,C61,C62,C63,C64,C65,C66,C68,C69,C70,C72,C73,C75,C76,C82,C83,C84,C85,C86,C96,C97,C98,C99,C100,C101,C102,C105,C106,C112,C113,C114,C125,C126,C127,C128,C130,C131,C132,C138,C141,C143,C162,C166,C170,C172,C175,C176,C177,C178,C181,C182,C184,C186,C188,C189,C190,C193,C196,C200,C203,C206,C207,C208,C209,C210,C214,C215,C216,C217,C218,C219,C220,C221,C222,C223,C224,C225,C226,C227,C229,C230,C233,C234,C235,C236,C237,C238,C239,C242,C243,C244,C245,C246,C248,C249,C250,C254,C255,C256,C257	YAGEO
87	4	CAP. PL. 0.022UF 100V K R5 2X7 RD	383929108		C1,C15,C87,C185	ISKRA

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88	18	CAP. SMD X7R 0805 103 M 50V 10NF	384604100		C24,C51,C133,C137,C139,C140,C142,C144,C145,C156,C157,C158,C164,C165,C167,C173,C174,C180	YAGEO
90	3	CAP. SMD CG 1206 332 J 5% 50V 3,3 NF	384603331		C201,C204,C205	YAGEO
91	19	CAP. SMD CG 0805 102 K 50V 1NF	384603100		C34,C111,C116,C121,C134,C135,C146,C147,C148,C149,C150,C151,C152,C153,C154,C159,C160,C168,C169	YAGEO
93	3	CAP. SMD CG 0805 471 K 50V 470PF	384602469		C183,C191,C192	YAGEO
94	1	CAP. SMD CG 0805 681 J 5% 50V 680 PF	384602679		C211	YAGEO
99	6	CAP. SMD CG 0805 151 J 50V 150 PF	384602149		C7,C9,C53,C91,C194,C198	YAGEO
100	2	CAP. SMD CG 0805 121 J 50V 120 PF	384602119		C109,C163	YAGEO
101	20	CAP. SMD CG 0805 101 J 50V 100 PF	384602099		C57,C67,C92,C93,C103,C104,C108,C110,C115,C117,C118,C119,C123,C124,C155,C171,C202,C232,C241,C253	YAGEO
105	3	CAP. SMD CG 0805 820 J 50V 82 PF	384601819		C42,C43,C44	YAGEO
106	6	CAP. SMD CG 0805 680 J 50V 68 PF	384601679		C80,C81,C90,C122,C179,C199	YAGEO
108	4	CAP. SMD CG 0805 470 J 50V 47 PF	384601469		C12,C41,C74,C89	YAGEO
109	2	CAP. SMD CG 0805 390 J 50V 39 PF	384601389		C45,C49	YAGEO
110	2	CAP. SMD CG 0805 330 J 50V 33 PF	384601329		C78,C120	YAGEO
111	4	CAP. SMD CG 0805 180 J 50V 18 PF	384601179		C56,C71,C88,C197	YAGEO
114	3	CAP. SMD CG 0805 8R2 C 50V 8,2 PF	384600820		C3,C52,C161	YAGEO
122	5	RESISTOR SMD 1206 1% 0,25W 4 M 75	393014470		R8,R18,R290,R300,R315	VITROHM
123	10	RESISTOR SMD 1206 1% 0,25W 1 M	392026100		R9,R53,R60,R170,R201,R232,R239,R289,R353,R355	VITROHM
126	1	RESISTOR SMD 1206 1% 0,25W 681 K	393013681		R329	VITROHM
127	7	RESISTOR SMD 1206 1% 0,25W 274 K	393013270		R49,R73,R241,R298,R301,R392,R393	VITROHM
128	2	RESISTOR SMD 1206 1% 0,25W 150 K	393013150		R72,R380	VITROHM
133	7	RESISTOR SMD 1206 1% 0,25W 33 K 2	393012332		R20,R22,R106,R129,R150,R285,R363	VITROHM
134	3	RESISTOR SMD 1206 1% 0,25W 27 K 4	393012274		R38,R61,R88	VITROHM
135	3	RESISTOR SMD 1206 1% 0,25W 22 K	393012220		R70,R113,R414	VITROHM
137	4	RESISTOR SMD 1206 1% 0,25W 15K	393012150		R109,R299,R336,R345	VITROHM
140	1	RESISTOR SMD 1206 1% 0,25W 10K	393012100		R459	VITROHM
141	4	RESISTOR SMD 1206 1% 0,25W 8 K 25	393011820		R132,R159,R160,R314	VITROHM
142	4	RESISTOR SMD 1206 1% 0,25W 6 K 81	393011680		R62,R330,R422,R425	VITROHM
143	5	RESISTOR SMD 1206 1% 0,25W 5 K 62	393011560		R47,R193,R268,R424,R429	VITROHM

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147	3	RESISTOR SMD 1206 1% 0,25W 2 K 21	393011220		R245,R282,R291	VITROHM
148	1	RESISTOR SMD 1206 1% 0,25W 1 K 5	393011150		R326	VITROHM
149	6	RESISTOR SMD 1206 1% 0,25W 1 K 21	393011120		R36,R131,R255,R277,R283, R423	VITROHM
153	15	RESISTOR SMD 1206 1% 0,25W 332 R	392022332		R147,R168,R246,R247,R248, R252,R253,R295,R296,R395, R396,R398,R400,R406,R407	VITROHM
154	5	RESISTOR SMD 1206 1% 0,25W 301 R	393010300		R71,R74,R92,R263,R264	VITROHM
157	6	RESISTOR SMD 1206 1% 0,25W 150 R	392022154		R15,R16,R188,R192,R212,R 218	VITROHM
162	9	RESISTOR SMD 1206 1% 0,25W 75 R 0	393010075		R119,R120,R173,R178,R182, R186,R219,R251,R267	VITROHM
163	9	RESISTOR SMD 1206 1% 0,25W 51 R 1	392021511		R154,R183,R189,R217,R226, R227,R265,R281,R292	VITROHM
165	11	RESISTOR SMD 1206 1% 0,25W 17 R 8	393010018		R210,R262,R413,R437,R440, R443,R445,R453,R454,R457, R458	VITROHM
166	10	RESISTOR SMD 1206 1% 0,25W 12 R 1	393010012		R10,R67,R78,R124,R126,R1 67,R174,R177,R270,R312	VITROHM
167	1	RESISTOR SMD 1206 1% 0,25W 0R	393009001		R86	VITROHM
170	15	RESISTOR SMD 0805 5% 0,125W 10M	395015100		R24,R25,R26,R56,R57,R94, R137,R157,R163,R294,R317, R356,R417,R435,R450	VITROHM
172	23	RESISTOR SMD 0805 1% 0,125W 100K	395013100		R19,R32,R44,R48,R52,R54, R64,R66,R95,R117,R156,R1 94,R238,R240,R244,R305,R3 44,R347,R354,R358,R379,R3 85,R426	VITROHM
173	17	RESISTOR SMD 0805 1% 0,125W 47 K 5	395012475		R34,R35,R63,R69,R136,R16 6,R286,R287,R304,R357,R36 0,R366,R367,R383,R401,R40 3,R421	VITROHM
174	65	RESISTOR SMD 0805 1% 0,125W 10 K	395012100		R21,R31,R45,R55,R59,R68, R75,R96,R112,R133,R138,R 139,R140,R142,R143,R162,R 165,R171,R190,R198,R200,R 202,R206,R233,R234,R235,R 236,R242,R254,R257,R284,R 288,R293,R309,R322,R325,R 337,R338,R339,R341,R342,R 346,R348,R359,R362,R364,R 369,R370,R376,R377,R381,R 382,R387,R388,R394,R399,R 402,R405,R409,R418,R427,R 438,R444,R448,R452	VITROHM

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175	14	RESISTOR SMD 0805 1% 0,125W 9 K 1	395011910		R42,R51,R82,R87,R141,R155,R187,R199,R220,R349,R371,R372,R442,R447,	VITROHM
177	25	RESISTOR SMD 0805 1% 0,125W 4 K 75	395011475		R43,R46,R104,R111,R115,R164,R169,R205,R216,R224,R230,R231,R269,R280,R297,R316,R332,R335,R351,R352,R361,R389,R408,R419,R449	VITROHM
178	13	RESISTOR SMD 0805 1% 0,125W 3 K 32	395011332		R40,R91,R125,R185,R228,R303,R313,R318,R327,R368,R404,R410,R420	VITROHM
179	13	RESISTOR SMD 0805 1% 0,125W 2 K 70	395011270		R29,R33,R39,R65,R76,R93,R97,R105,R195,R221,R271,R276,R334	VITROHM
181	43	RESISTOR SMD 0805 1% 0,125W 1 K	395011100		R11,R30,R37,R58,R80,R81,R84,R89,R101,R107,R114,R128,R146,R191,R204,R207,R225,R258,R259,R260,R261,R272,R275,R279,R306,R310,R311,R319,R320,R321,R323,R328,R331,R333,R350,R373,R374,R375,R378,R384,R386,R397,R412	VITROHM
183	19	RESISTOR SMD 0805 1% 0,125W 511 R	395010511		R1,R13,R27,R90,R99,R100,R102,R118,R134,R135,R153,R175,R176,R211,R266,R278,R411,R439,R451	VITROHM
184	24	RESISTOR SMD 0805 1% 0,125W 392 R	395010392		R4,R5,R6,R14,R17,R23,R28,R77,R79,R83,R85,R98,R122,R123,R130,R151,R152,R158,R179,R180,R181,R223,R340,R343	VITROHM
185	15	RESISTOR SMD 0805 1% 0,125W 240 R	395010240		R2,R103,R108,R145,R149,R222,R237,R249,R250,R256,R324,R415,R416,R434,R455	VITROHM
186	12	RESISTOR SMD 0805 1% 0,125W 220 R	395010220		R41,R209,R213,R214,R229,R390,R391,R428,R436,R441,R446,R456	VITROHM
188	24	RESISTOR SMD 0805 1% 0,125W 100 R	395010100		R3,R7,R12,R50,R110,R116,R121,R127,R144,R148,R184,R196,R197,R215,R243,R273,R274,R302,R307,R308,R430,R431,R432,R433,	VITROHM
191	24	CHOKE SIMID 6,8 UH 5% B82422-T1682-J	387900680		L1,L2,L3,L4,L5,L6,L8,L10,L12,L13,L15,L16,L17,L18,L19,L20,L21,L22,L24,L25,L27,L28,L29,L30	SIEMENS
192	4	CHOKE SIMID 02 0,22UH B82422-A3221-M	387802022		L11,L14,L23,L26	SIEMENS

	Designation:	Stock No.:	Page:	MODULATOR_VISION_MVP_V2_a	File:	
	PCB MODULATOR VISION MVP V2.0	803562021	Date:	8.22.08	Disk:	

No.	Pcs.	Designation:	Stock No.:	Alt	Signature	Rem./Ven.
193	2	CHOKE SIMID 02 1 UH B82422-A1102-K	387901101		L7,L9	SIEMENS
194	2	CHOKE FERITNA D6L 3C 3,8 UH-02	373980101		L31,L32	ISKRA
195	2	COUPLER OC 10	801500533		OC1,OC2	IMP
198	2	CHANGE-OVER C42315 A60 A25	310901101		S1,S2	SIEMENS
199	0,2	CABLE KOAX. RG-178 B/U	306197178			SUHNER
200	1	CONNECTOR ANGLE 64-POL. (M) STV-C-64-M-AC	373908368		X5	ERNI
202	1	BRIDGE CAB4 40 F 4235 BLACK	389210235		JP1	FISCHER
203	0,4	CONTACT STRIP 2-VR 2X36P M 2,54 SL 22 112 G	373908157		X3	FISCHER
206	2	CAP. SKOZ. BDBQ-02 160V 1NF -20+100%	383068100		CS1,CS2	ISKRA
207	2	CONNECTOR MINI (ECO) 23-SMA-50-0-44	373905123			SUHNER

3.4 Linearity Corrector KL-MC

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Linearity Corrector KL-MC



LINEARITY CORRECTOR KL-MC

Electrical diagram: 803562043

1. General description

(electrical and block diagram : 803611740)

Linearity corrector module consists of:

- A. Group delay corrector
- B. Linearity corrector

1.A Group Delay Corrector

This circuitry corrects group delay characteristic of the transmitter which is caused by RF filters. The trimmer capacitors on the PCB “Corr-D” determine the frequency of group delay correction, while adjustable coils on the same board correct the amplitude-frequency characteristic of corrector.

Corrector is possible to switch off by means of MCU unit in the menu: 1.E Correctors« > »1b.Advanced« > »Group dly : ON/OFF .

1.B Linearity corrector

The Linearity corrector equalizes the non-linearities of power amplifiers with the LDMOS transistors. It is suited for the transmitters with combined amplification of vision and sound.

Corrector module consists of 4 segments which add a non-linear part to the corrector characteristic at any level. At the output a linear and non-linear parts of the signal are added up.

The following parameters are set on the each segment from 1 to 4 by means of MCU in the menu: »1.E Correctors« > »1b.Advanced« > »Linearity : ON«>

- 1) Threshold (Thr 1..4) : inset point of non-linear part from white level (0%) to sych level (100%)
- 2) Sharpness (Sha 1..4) : width of inset point of non-linear part
- 3) I 1..4 , Q 1..4 : amplitude and phase of non-linear part of corrector. I parameter adds non-linear part on phase with linear section and Q parameter phase shifted for 90°. Any combination of I and Q parameters enables all amplitudes from 0 to 100% and phase from 0° to 360°.

Segments from 1 to 4 have a defined function depends on picture content. Recommended presettings of segments are:

Segment	Threshold	Sharpness
1.white level	0..20%	0..100%
2.gray level	10..50%	0..30%
3.black level	30..50%	0..50%
4.sync level	40..100%	0..100%

A segment is ineffective with the following settings:

Thr =100%, Sha=0%, I=0%, Q=0%.

Linearity Corrector is possible to switch off by means of MCU unit in the menu: 1.E Correctors« > »1b.Advanced« > »Linearity : ON/OFF .

2. Adjusting the Corrector

2.A Required measurement equipment:

1. Video Generator with »side band« generator
2. Demodulator
3. Video Analyzer
4. TV oscilloscope with differentiating input filter or band-pass filter 242kHz
5. Spectrum Analyzer

2.B Pre-setting the test signals

1. TS1: Video generator is set to the staircase with 10 steps or sawtooth. Audio input AF2 is modulated with 5% nominal deviation by frequency 100Hz.
2. TS2: Video generator is set to the gray level (50% modulation). Sinewave signal of 4,43MHz frequency is superposed from black to white level.
3. TS3: Video generator is set to the gray level (50% modulation). Sinewave signal of 1 MHz frequency is superposed from black to white level.

2.C Pre-setting the corrector

Parameters I 1..4 = 0%, Q 1..4 = 0%

Segment	Level	Sharpness
1	0%	20%
2	20%	0%
3	40%	0%
4	55%	20%

2.D Adjusting Procedure

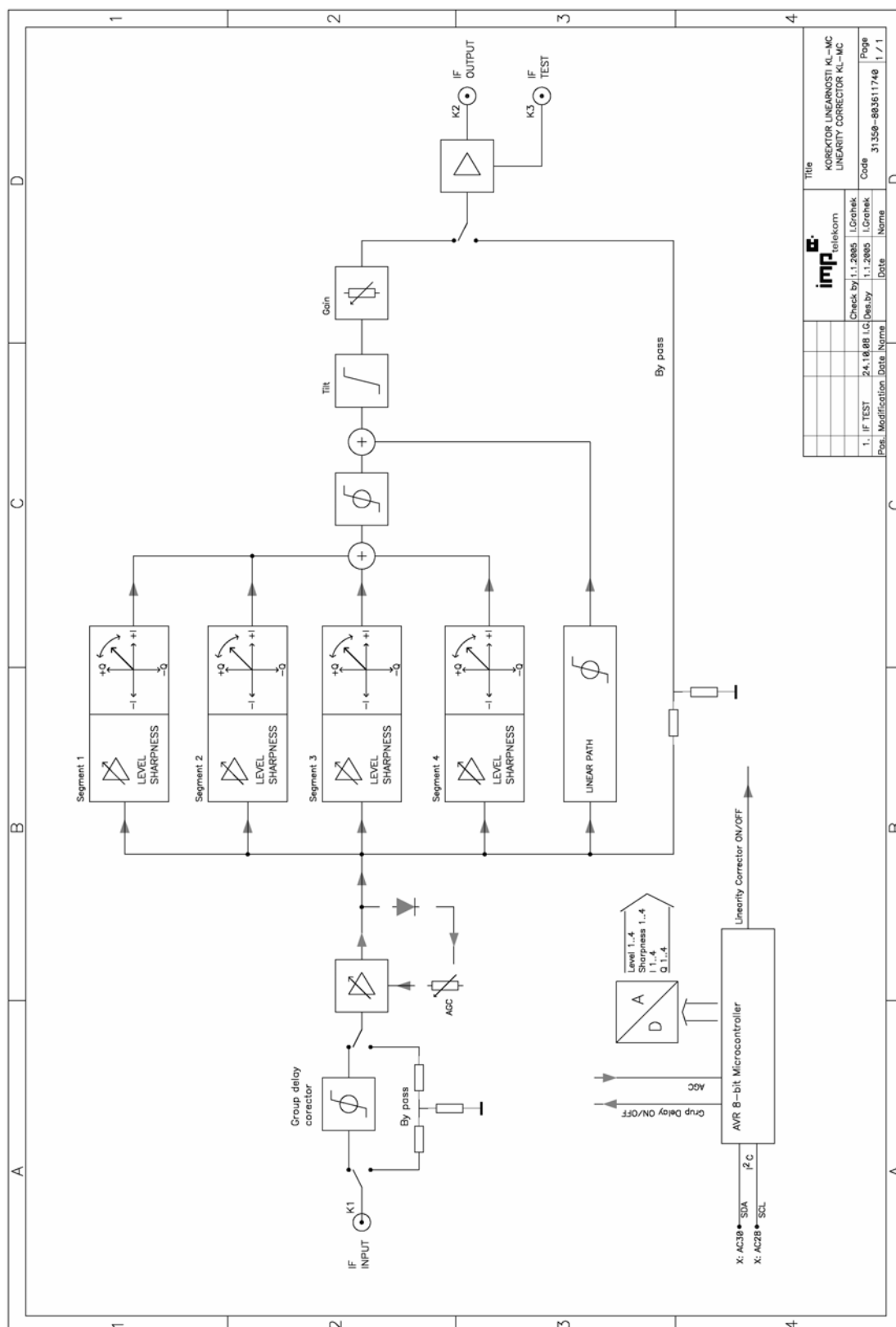
1. Switch on the linearity corrector
2. Apply test signal TS1
3. Watch the zero-line of the differentiated staircase at the TV oscilloscope. Minimise response with I and Q parameters. Start with segment 1 and continue with 2,3 and 4. Modify also the thresholds and sharpnesses carefully during the above procedure.
4. Check the IM-products with Spectrum Analyzer. Apply test signals TS2 and TS3. Segments 1 to 3 are corrected.
5. Check the sync pulse. Segment 4 is corrected.
6. Repeat the steps 3 to 5 as long as no further improvement is reached.
7. By means of potentiometer P2 correct the amplitude-frequency response of linearity corrector.
8. By means of potentiometer P4 set the output level of corrector to 100mVrms.

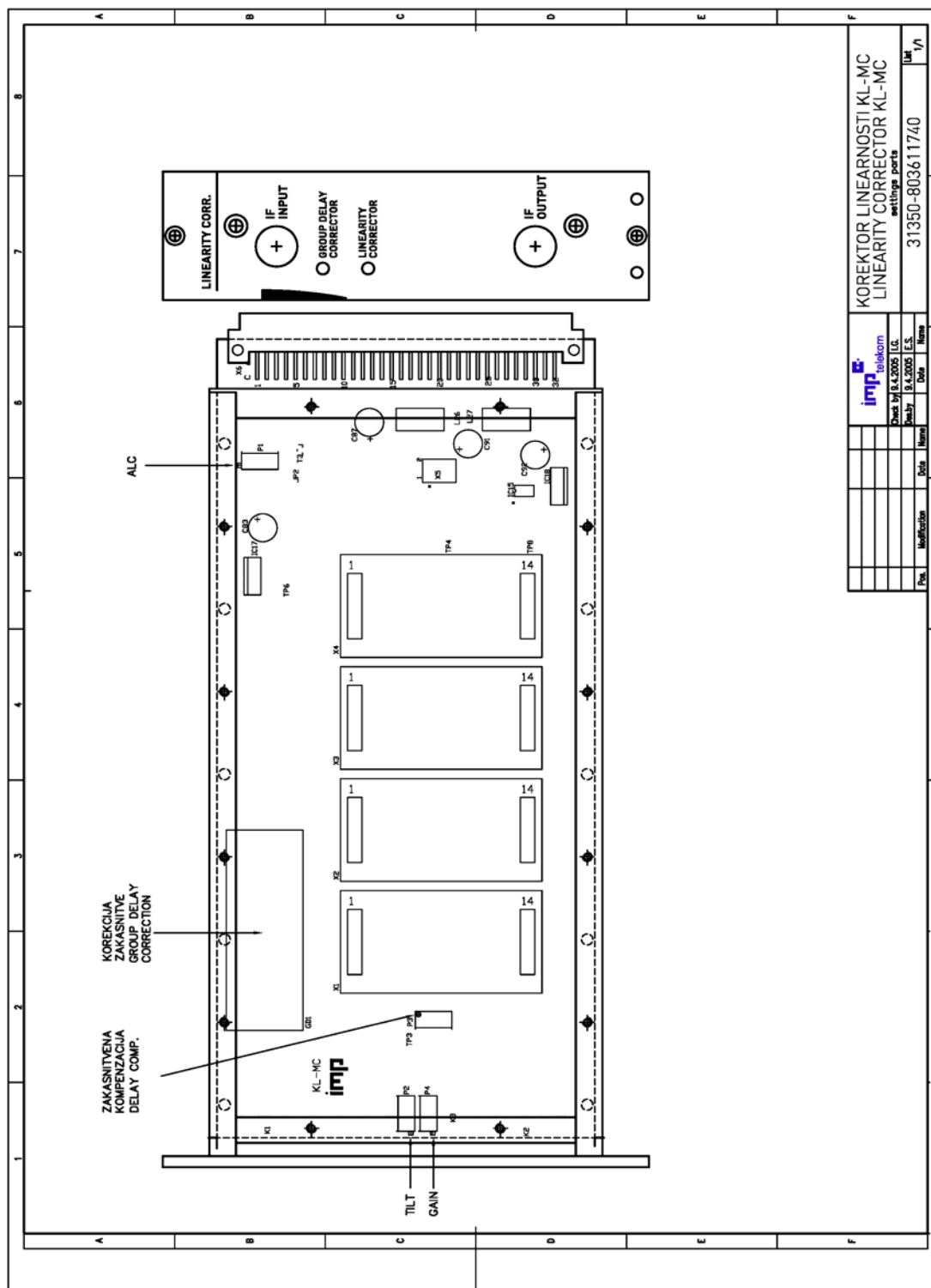
3. Technical specifications

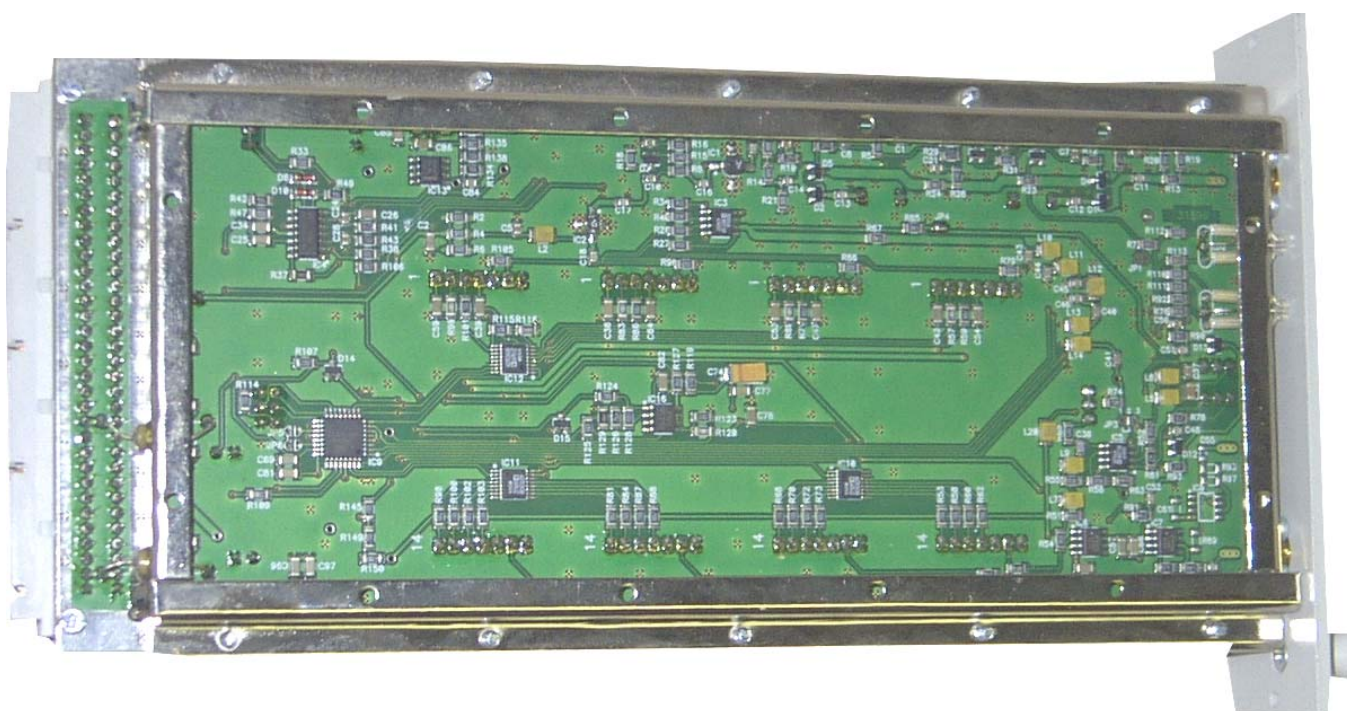
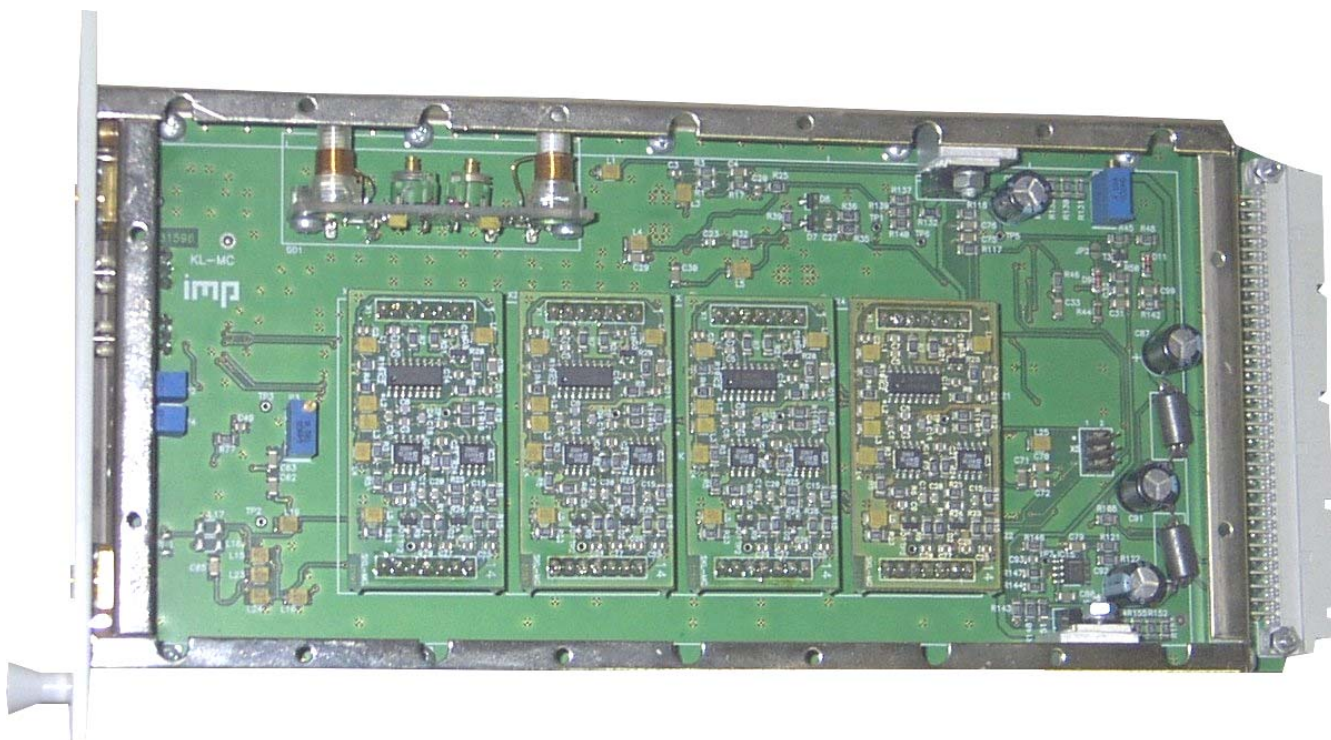
IM product*	> 39 dB
Luminance non-linearity*	< 10%
ICPM*	< $\pm 2^\circ$
Differential gain*	< $\pm 5\%$
Differential phase*	< $\pm 3^\circ$
Corrector input level	100mVrms (-7dBm)
Corrector output level	100mVrms (-7dBm)
Signal / noise (200kHz – 5Mhz)	> 60 dB
Power Supply	+12 V (370mA) -12 V (220mA)

* Recommended characteristics of TV transmitter without correction

2. Block diagram





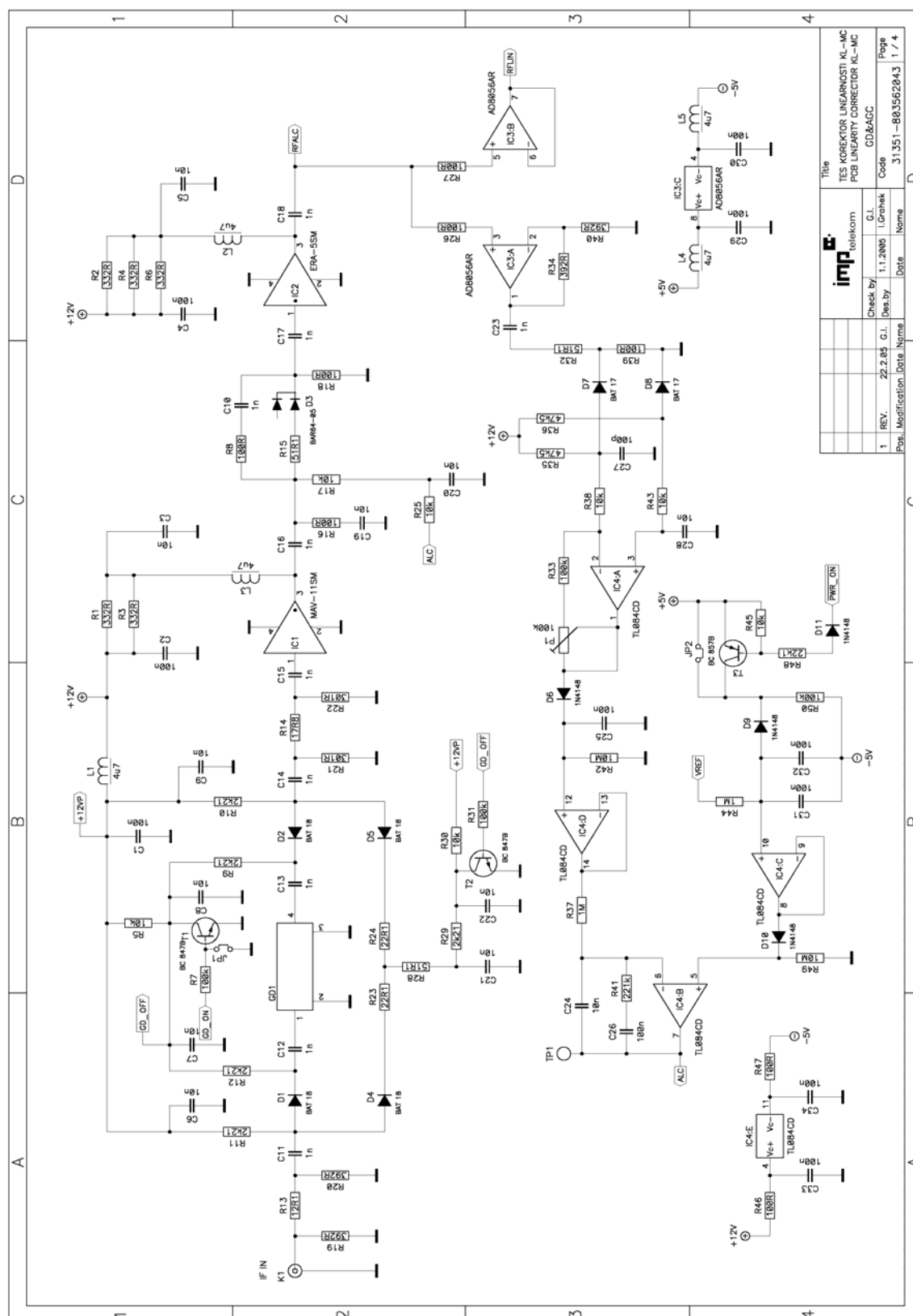


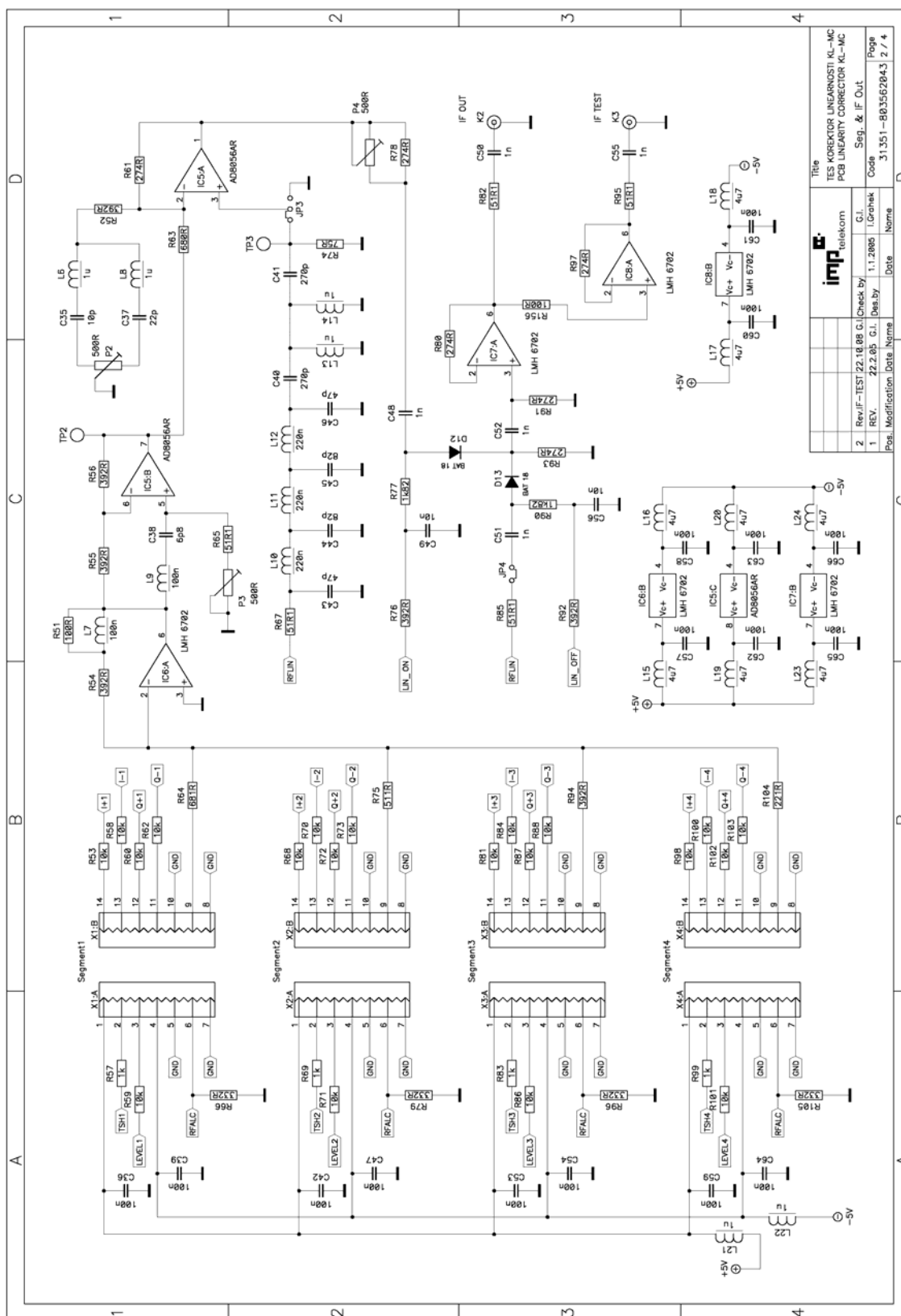
Corrector Lin.KL-MC
31350-803611740

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	<i>CORRECTOR LINEARITY KL-MC</i>	31350	Date:	14.10.2008	Disk:	

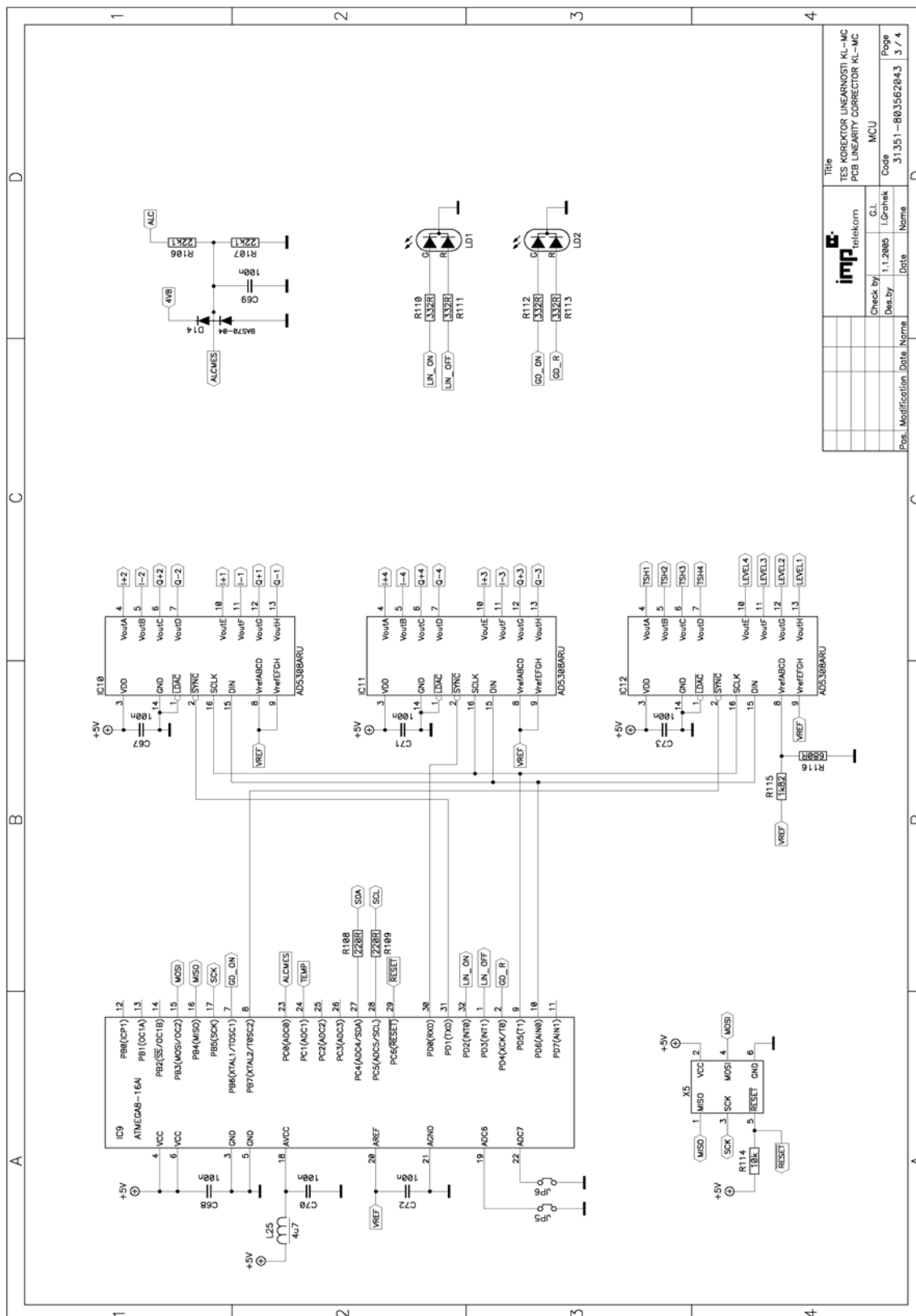
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5. Electrical diagram for KL-MC (GD&AGC)

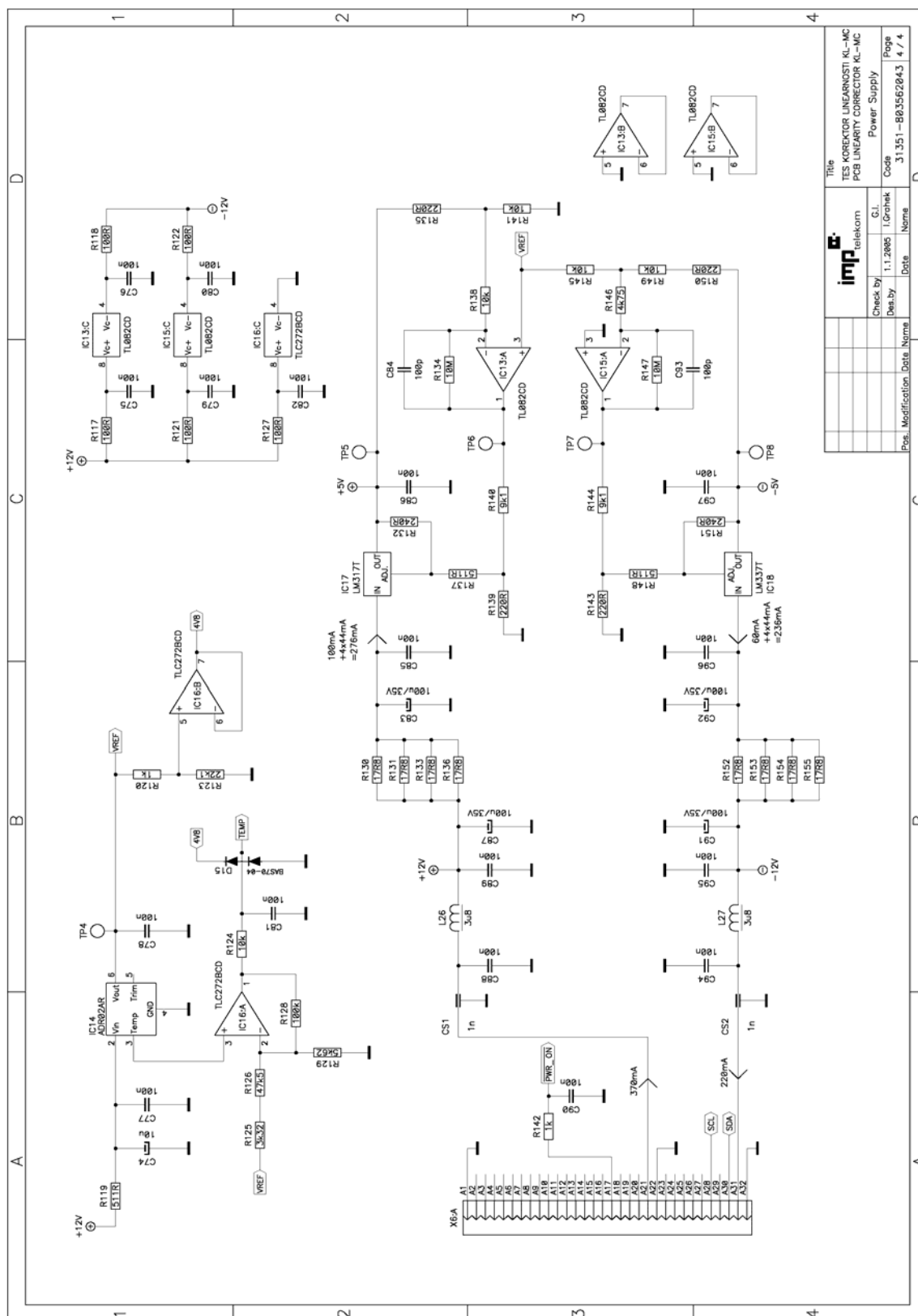


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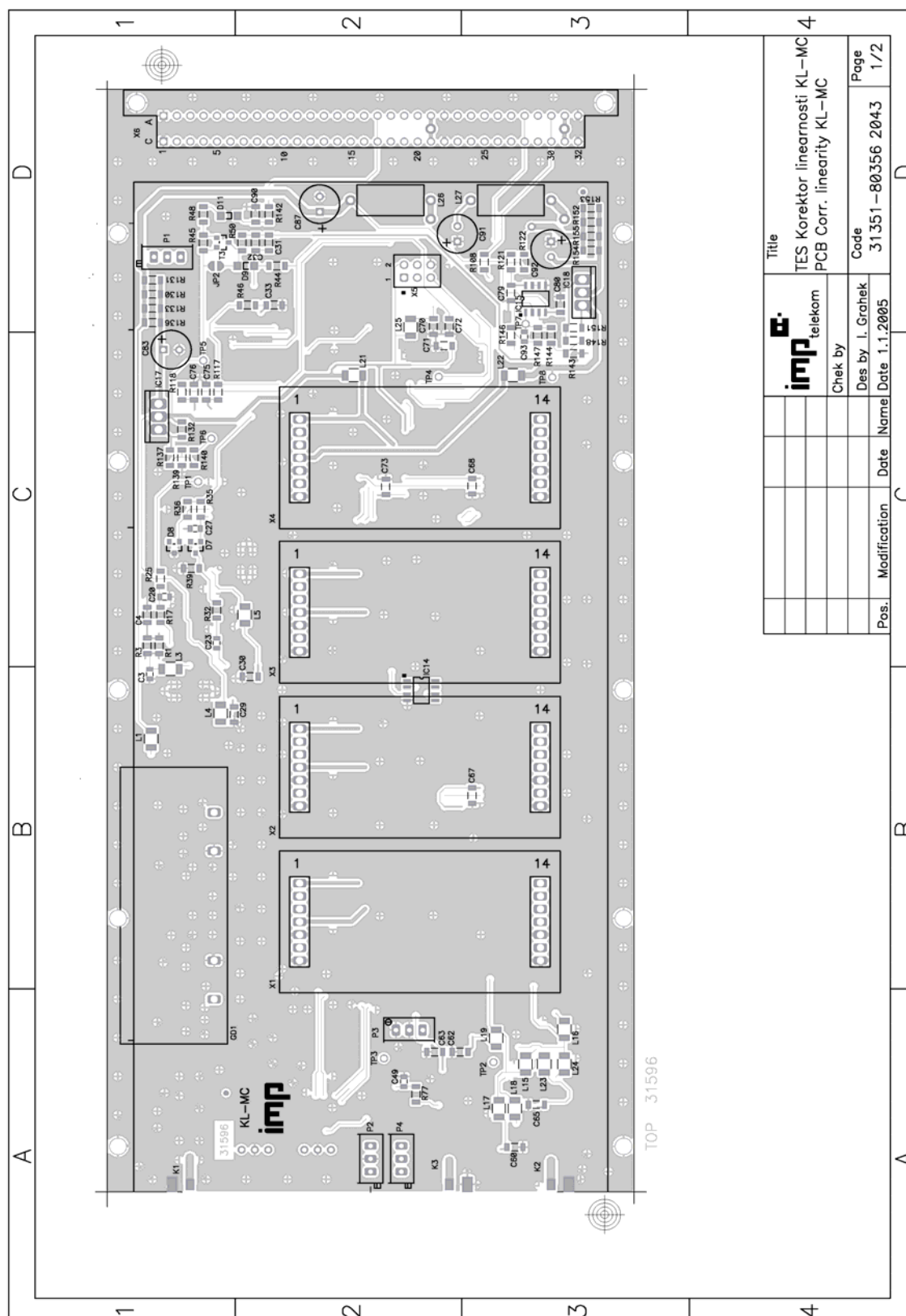
7. Electrical diagram for KL-MC (MCU)



8. Electrical diagram for KL-MC (Power Supply)



9. PCB Linearity Corrector KL-MC





31351-80356 2043 2/2

10. Bill of material for PCB KL-MC

	Designation:	Stock No.	Page:		Datoteka:	
	PCB LINEARITY CORRECTOR KL-MC	31351	Date:	14.10.2008	Disk:	
		31608(STS)		803562043		

No.	Pcs	Designation	Stock No.	Alt	Signature	Rem./Ven.
2	1	PCB KL-MC	31596			IMP
4	3	IC 8-BIT DAC AD5308 ARU TSSOP-16	385088250		IC10,IC11,IC12	AD
6	2	IC VIDEO OP. AMP. AD 8056 AR SO-8	385095008		IC3,IC5	AD
8	1	IC VOLT. REF. ADR02 AR SO-8	385088254		IC14	AD
10	1	IC MICROCONTROLLER ATMEGA8-16AI SO-3	385078443		IC9	ATMEL
12	1	IC PREC. OP. AMP. TLC 272 BCD SO-8	385083272		IC16	TI
13	3	IC OP. AMP. LMH6702MA SOIC-8	385083367		IC6,IC7,IC8	NSC
14	1	IC SMD QUAD OP AMP TL 084 CD SO-14	385055084		IC4	NSC
16	2	IC SMD OP AMP TL 082 CD SO-8	385055082		IC13,IC15	NSC
18	1	MMIC AMP. SMD HIBRID ERA-5 SM	385086605		IC2	MINI CIRCUIT
19	1	MMIC AMPLIFIER MAV-11 SM	385086012		IC1	MINI CIRCUIT
20	1	VOLT. REGUL. LM317T TO220	385083317		IC17	NSC
22	1	VOLT. REGUL. LM 337 T	385083337		IC18	NSC
24	2	TRANSISTOR SMD (NPN) BC 847B	385046848		T1,T2	PHILIPS
26	1	TRANSISTOR SMD (PNP) BC 857 B	385010856		T3	PHILIPS
28	1	PIN DIODE SMD BAR 64-05 (SOT23)	385300064		D3	PHILIPS
30	2	DIODE SMD BAS 70-04	385330004		D14,D15	PHILIPS
32	2	DIODE SMD (SOT23) BAT 17 Q62702-A50	385310017		D7,D8	SIEMENS
34	6	DIODE SMD BAT 18	385310018		D1,D2,D4,D5,D12,D13	SIEMENS
36	4	DIODE SMD (MELF) LL4148	385290148		D6,D9,D10,D11	PHILIPS
38	2	DIODE LED RD/ZE, FI 3MM L-93 WEGW	385255039		LD1,LD2	KINGBRIGHT
40	1	POT. 3296 W-1-501 500R	388906103		P3	BOURNS
42	1	POT. 3296-X-1-104 100K	388904002		P1	BOURNS
44	2	POT. 3296-X-1-501 500R	388904007		P2,P4	BOURNS
46	4	ELKO 100UF 35V M R3.5 8X12	383400041		C83,C87,C91,C92	ROEDERSTEIN
48	1	CAP TANSMD 10UF 16V C M	384651009		C74	KEMET
50	51	CAP SMD 100NF 63V X7R 1206 M	384605101		C1,C2,C4,C25,C26,C29, C30,C31,C32,C33,C34, C36,C39,C42,C47,C53, C54,C57,C58,C59,C60, C61,C62,C63,C64,C65, C66,C67,C68,C69,C70, C71,C72,C73,C75,C76, C77,C78,C79,C80,C81, C82,C85,C86,C88,C89, C90,C94,C95,C96,C97	YAGEO
52	14	CAP SMD 10NF 50V X7R 0805 M	384604100		C3,C5,C6,C7,C8,C9,C19, C20,C21,C22,C24,C28, C49,C56	YAGEO

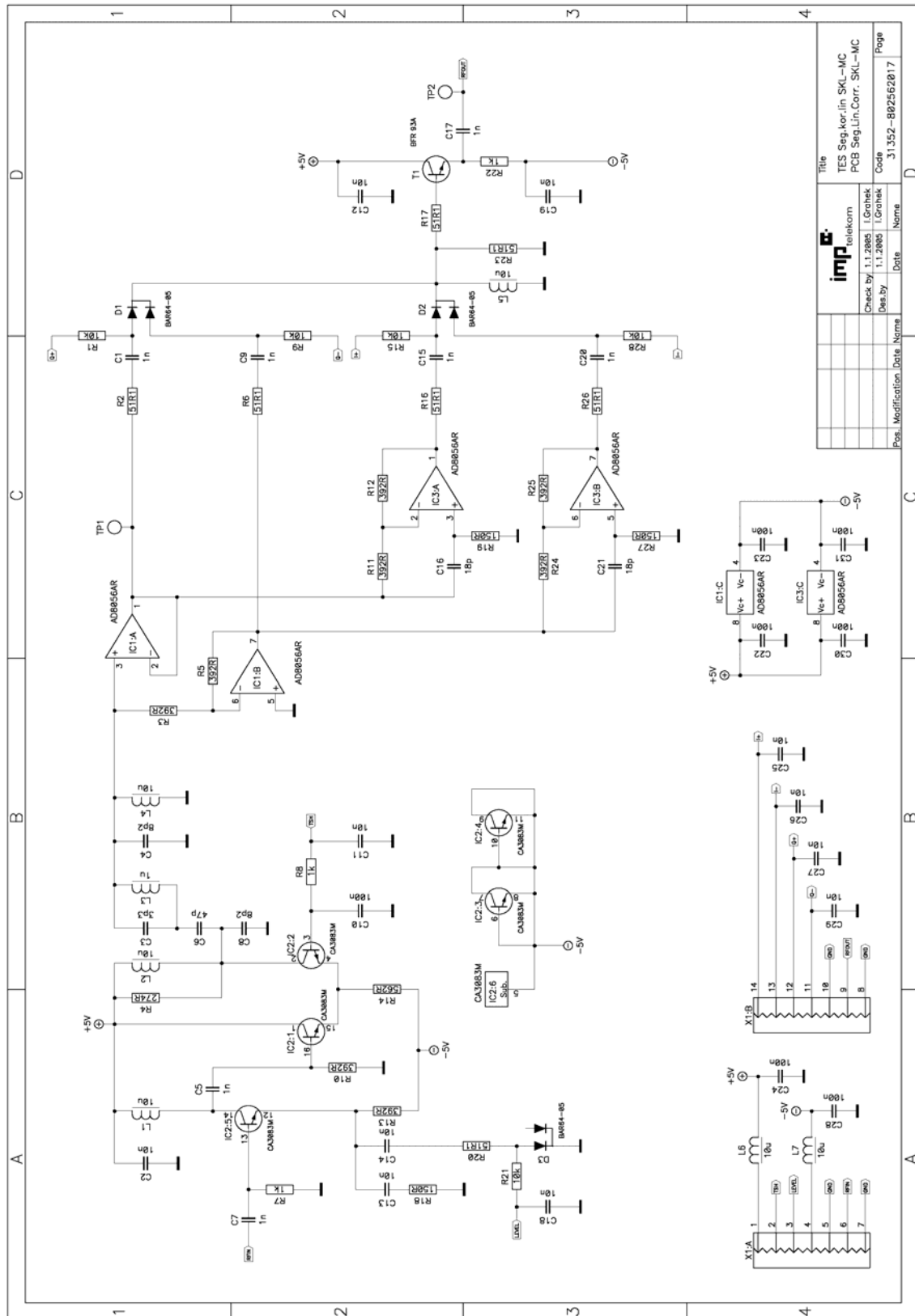
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		31608(STS)		803562043		

No.	Pcs	Designation	Stock No.	Alt	Signature	Rem./Ven.
54	15	CAP SMD 1NF 50V CG 0805 K	384603100		C10,C11,C12,C13,C14, C15,C16,C17,C18,C23, C48,C50,C51,C52,C55	YAGEO
56	2	CAP SMD 270PF 50V CG 0805 J	384602269		C40,C41	YAGEO
62	3	CAP SMD 100PF 50V CG 0805 J	384602099		C27,C84,C93	YAGEO
64	2	CAP SMD 82PF 50V CG 0805 J	384601819		C44,C45	YAGEO
65	2	CAP SMD 47PF 50V CG 0805 J	384601469		C43,C46	YAGEO
66	1	CAP SMD 22PF 50V CG 0805 J	384601219		C37	YAGEO
68	1	CAP SMD 10PF 50V CG 0805 J	384601099		C35	YAGEO
69	1	CAP SMD 6,8PF 50V CG 0805 C	384600680		C38	YAGEO
70	4	RESISTOR SMD 10M 1206 0,25W 5%	393015100		R42,R49,R134,R147	VITROHM
74	2	RESISTOR SMD 1M 1206 0,25W 1%	392026100		R37,R44	VITROHM
75	1	RESISTOR SMD 221K 1206 0,25W 1%	393013221		R41	VITROHM
76	5	RESISTOR SMD 100K 1206 0,25W 1%	393013100		R7,R31,R33,R50,R128	VITROHM
78	3	RESISTOR SMD 47K5 1206 0,25W 1%	392024475		R35,R36,R126	VITROHM
82	4	RESISTOR SMD 22K 1206 0,25W 1%	393012220		R48,R106,R107,R123	VITROHM
84	33	RESISTOR SMD 10K 1206 0,25W 1%	393012100		R5,R17,R25,R30,R38, R43,R45,R53,R58,R59, R60,R62,R68,R70,R71, R72,R73,R81,R84,R86, R87,R88,R98,R100, R101,R102,R103,R114, R124,R138,R141,R145, R149	VITROHM
86	2	RESISTOR SMD 9K1 1206 0,25W 1%	393011910		R140,R144	VITROHM
88	1	RESISTOR SMD 5K62 1206 0,25W 1%	393011560		R129	VITROHM
90	1	RESISTOR SMD 4K75 1206 0,25W 1%	393011470		R146	VITROHM
92	1	RESISTOR SMD 3K32 1206 0,25W 1%	393011330		R125	
94	5	RESISTOR SMD 2K21 1206 0,25W 1%	393011220		R9,R10,R11,R12,R29	VITROHM
96	3	RESISTOR SMD 1K82 1206 0,25W 1%	393011180		R77,R90,R115	VITROHM
98	6	RESISTOR SMD 1K 1206 0,25W 1%	393011100		R57,R69,R83,R99, R120,R142	VITROHM
100	3	RESISTOR SMD 681R 1206 0,25W 1%	393010680		R64,R63,R116	VITROHM
101	11	RESISTOR SMD 392R 1206 0,25W 1%	393010390		R19,R20,R34,R40,R52, R54,R55,R56,R76,R92, R94	VITROHM
102	4	RESISTOR SMD 511R 1206 0,25W 1%	393010510		R75,R119,R137,R148	VITROHM
104	13	RESISTOR SMD 332R 1206 0,25W 1%	392022332		R1,R2,R3,R4,R6,R66, R79,R96,R105,R110, R111,R112,R113	VITROHM
106	2	RESISTOR SMD 301R 1206 0,25W 1%	393010300		R21,R22	VITROHM
108	6	RESISTOR SMD 274R 1206 0,25W 1%	393010270		R61,R78,R80,R91, R93,R97	VITROHM
110	2	RESISTOR SMD 243R 1206 0,25W 1%	393010240		R132,R151	VITROHM

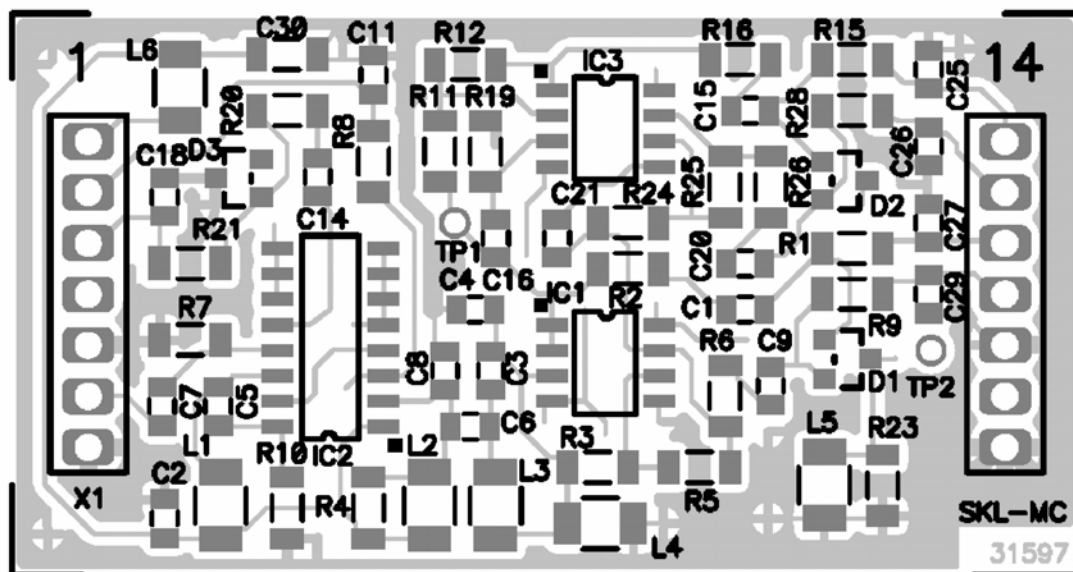
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		31608(STS)		803562043		

No.	Pcs	Designation	Stock No.	Alt	Signature	Rem./Ven.
112	7	RESISTOR SMD 221R 1206 0,25W 1%	393010220		R104,R108,R109,R135, R139,R143,R150	VITROHM
114	15	RESISTOR SMD 100R 1206 0,25W 1%	393010100		R8,R16,R18,R26,R27, R39,R46,R47,R51,R89, R117,R118,R121,R122, R127	VITROHM
116	1	RESISTOR SMD 75R0 1206 0,25W 1%	393010075		R74	VITROHM
117	8	RESISTOR SMD 51R1 1206 0,25W 1%	392021511		R15,R28,R32,R65,R67, R82,R85,R95	VITROHM
118	2	RESISTOR SMD 22R1 1206 0,25W 1%	393010022		R23,R24	VITROHM
120	9	RESISTOR SMD 17R8 1206 0,25W 1%	393010018		R14,R130,R131,R133, R136,R152,R153,R154, R155	VITROHM
121	1	RESISTOR SMD 12R1 1206 0,25W 1%	393010012		R13	VITROHM
122	2	CHOKE FERITNA D6L 3C 3,8UH-02	373980101		L26,L27	ISKRA
124	2	COIL SMD 0,1UH B82422-A3 101-	387800010		L7,L9	SIEMENS
126	3	CHOKE SIMID 02 0,22UH B82422-A322	387802022		L10,L11,L12	SIEMENS
128	6	CHOKE SIMID 02 1UH B82422-A1102-	387901101		L6,L8,L13,L14,L21,L22	SIEMENS
130	14	COIL SIMID 01 4,7UH B82412A1472	387800470		L1,L2,L3,L4,L5,L15, L16,L17,L18,L19,L20, L23,L24,L25	SIEMENS
132	1,56	SQUARE-PIN 1-ROW 36-P F 2.54 BL 1	373908152		X1÷ X4	
134	0,1	SQUARE-PIN 2-ROW 2X36P M2.54 SL22 112G	373908157		X5	FISCHER
136	1	CONNECTOR KOT 64-P (M) STV-C-64-M-AC	373908368		X6	ERNI

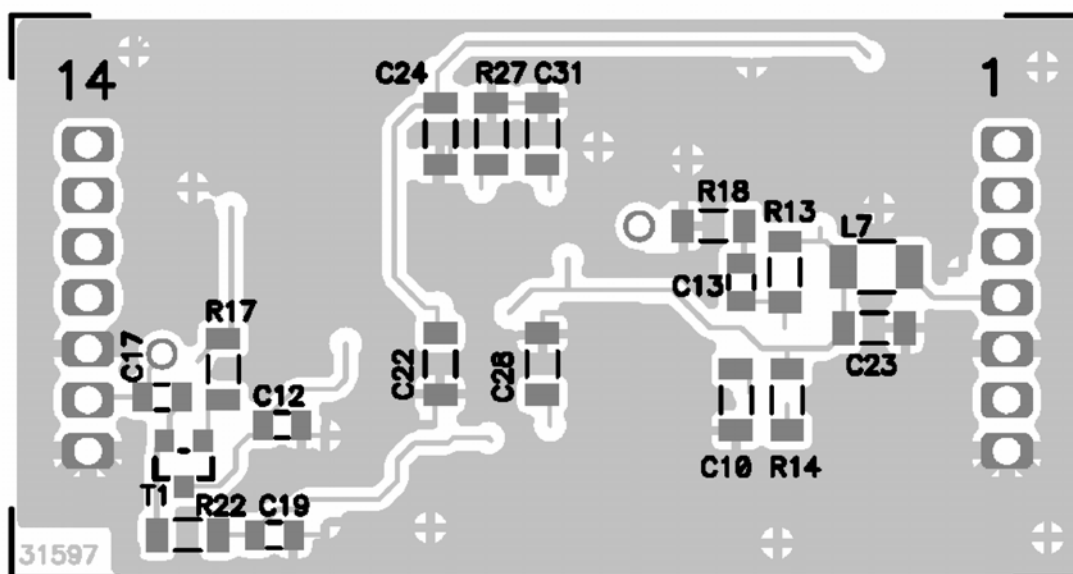
11. Electrical diagram for segment KL-MC



12. PCB Segment KL-MC



TOP



BOTTOM

TES SKL-MC
PCB SKL-MC
31352-802562017

[illegible]

3.5 RF Converter IRCD-AVB,DVB

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RF Converter IRCD-AVB,DVB



RF UP CONVERTER IRCD – AVB (DVB)

1. Description of operation

(see electric diagram nr: 34123 and block diagram nr. 34125)

RF Up converter is designed in two configuration:

1. IRCD-AVB: include OCXO 10MHz oscillator
2. IRCD-DVB: without internal OCXO oscillator. External 10MHz reference signal is needed.

RF converter uses double frequency conversion. An input intermediate frequency signal (IF input 36 MHz) is converted to the output frequency in range between 40 and 860 MHz by spectral inversion.

The preciseness of frequency conversion is depended on 10 MHz source. At IRCD-AVB configuration the internal 10 MHz OCXO oscillator can be synchronized by external source 10, 5, 2, 1 MHz.

The output channel of RF Upconverter is set by microcontroller user interface MCE-OTVP. For channel change no any other tuning is necessary.

On the output of the module is amplifier of RF level. It controls the output level in manual or automatic mode.

In manual mode (MAN) the output level is set by the potentiometer P2 on the front plate.

In automatic mode (AUTO) of the output level, the two measuring points (INT/EXT) are set for AGC regulation.

1. The INT measuring point is placed on the motherboard contact 15 (P2W-ALC). The measuring probe is in the RF amplifier which is in the position X9 on the motherboard (RFA-402 or RFA-410)

2. The EXT measuring point is placed on the output of the exciter. Signal is led from the exciter to the output connection AGC EXT (the back side of the exciter). For the nominal power 0dB on the output amplifier stage signal level is 3,2V DC.

The gain of the module is limited by setting Gain lim from 0dB to -12dB. The reserve from 1.5dB to 2dB is recommended for the gain at automatic control of the output power. The measure of AGC level shows the voltage of AGC regulation.

The proposed setting for the cold transmitter is 90% and for the warm transmitter is 110%.

AGC level	Remark	
< 90%	Amplifier chain has too high gain	Reduce the gain
90 .. 110%	Optimal setting	
>130%	AGC not work. The output power depend on the temperature and the level of the input signal	Increase the gain of module, if the nominal input signal is present

The state of module is showed by the coloured led diodes on the front plate:

	Green	Green-blinks	Red	Yellow-blinks	Red-blinks
Oscillator	OK	OCXO osc. is not synchronized to external source	Fault		The reference signal 10MHz is not present
AutoGain Control	AUTO		MANUAL	AGC level is out of range	

2. MCE menu description

1.Settings / 12. Exciter

- Pout : +1 .. - 6 dB output power (AUTO mode) setting
- Level : MANUAL/AUTO regulation of the output power
- Gain lim. : 0 .. -12 dB module gain limit - setting
- AGC level = 0 .. 140% AGC voltage control
- AGC point : INT/EXT RF measuring probe location

1.Settings / 14.Oscillator

- Channel setting:
 - o VHF 1: Chan 2 .. 4 (only AVB)
 - o VHF 3: Chan 5 .. 12
 - o UHF : Chan 21 .. 69
 - o VHF (OIRT): Chan R2..R12 (only AVB)
- Offset setting: Offs: ± 150000 Hz
- Manual frequency setting for OCXO oscillator (only AVB):
 - F.Cor.Coarse: 0..1023 coarse frequency adjustment
 - F.Cor.Fine: $\pm 100\%$ fine adjustment approx. ± 2 Hz on 45 channel
- Selecting external reference for OCXO oscillator (only AVB):
 - INT manual setting of internal OCXO oscillator frequency
 - EXT 10, 5, 2, 1 MHz external synchronization

2.Metering / 24. IF/RF Converter :

- PLL Q : LOCK/WORKING/UNLOCK OCXO oscillator – operate (only AVB)
- PLL IF : LOCK/UNLOCK first oscillator - operate
- PLL Out : LOCK/UNLOCK second oscillator - operate
- Ext ref = OK/LOW presence of external reference
- UPLL Q = 0..100% OCXO osc. – control voltage (AVB)
- UPLL IF = 0..100% First VCO oscillator – control voltage
- UPLL out = 0.. 100% Second VCO oscillator – control voltage
- Th = -20 .. 100 °C temperature inside module

3.Technical data

IF vhod

Nominal input level	-10dBm ± 3 dB , OFDM
	-7dBm peak sync
Central frequency	36MHz

	38.9MHz video carrier
Input matching	> 20dB

Reference input DVB

Nominal input level	0dBm
Input matching (50Ω)	> 20dB
Frequency	10MHz ± 1ppm

Reference input AVB

Nominal input level	-6 .. 13 dBm
Input matching (50Ω)	> 20dB
Frequency	10,5,2,1 MHz ± 1ppm

RF output

Gain	9dB ±1.5dB
Output matching	> 18dB in channel
Frequency range	40MHz do 860MHz
Frequency step	1Hz
Output frequency stability	< 0,001 Hz
Amplitude diagram ± 3.8MHz	±0,5dB
Group delay response ± 3.8MHz	±20ns

Phase noise

10Hz:	< - 55dBc/Hz
100Hz:	< - 85dBc/Hz
3kHz:	< - 90dBc/Hz
1MHz:	< - 130dBc/Hz

OFDM shoulder level

< -48dB measuring ± 4.2MHz from the central frequency

Intermodulation product

< -60dB measured with three carriers VC = -8dB, SBC = -16dB, SC = -10dB

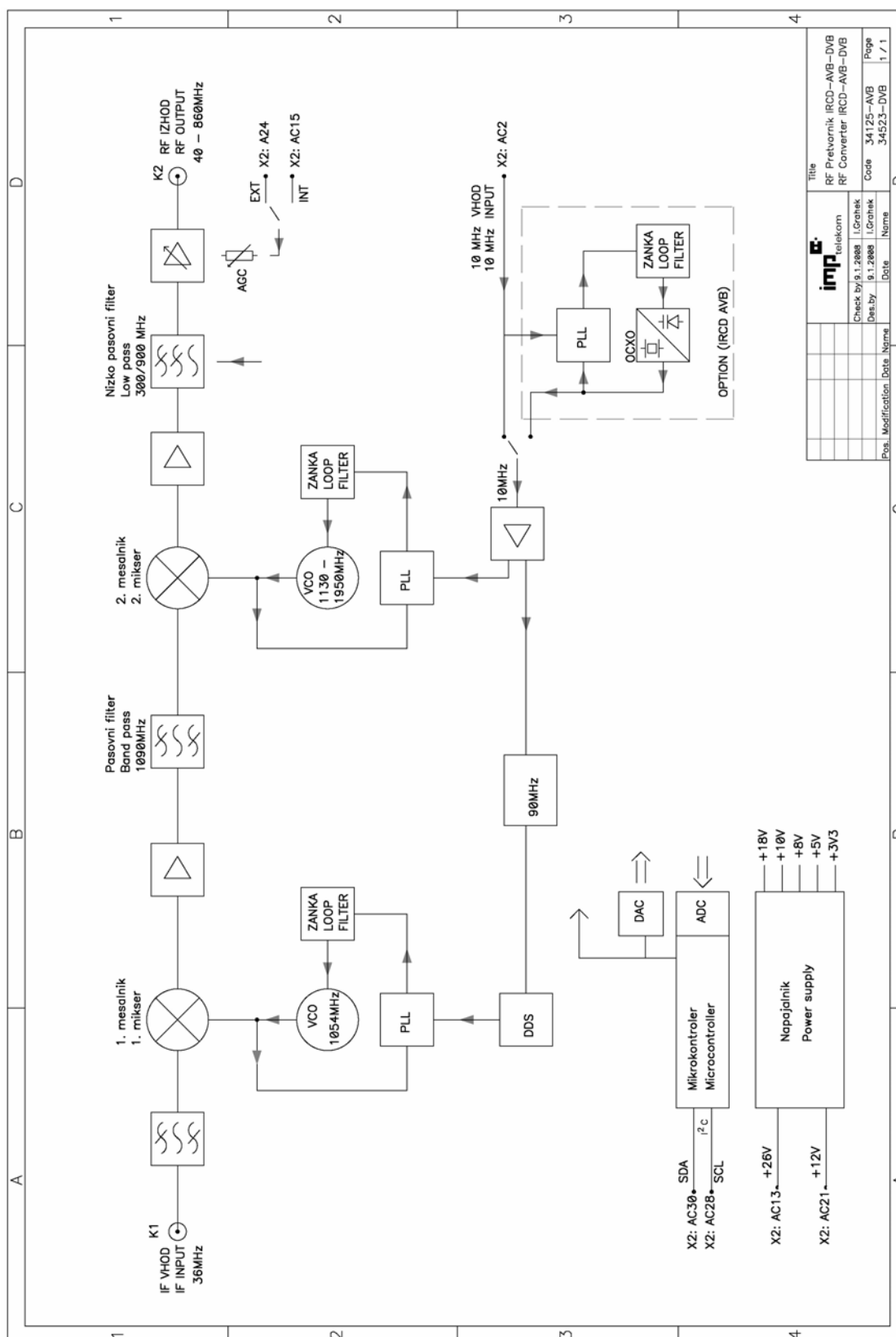
Out of channel signals:

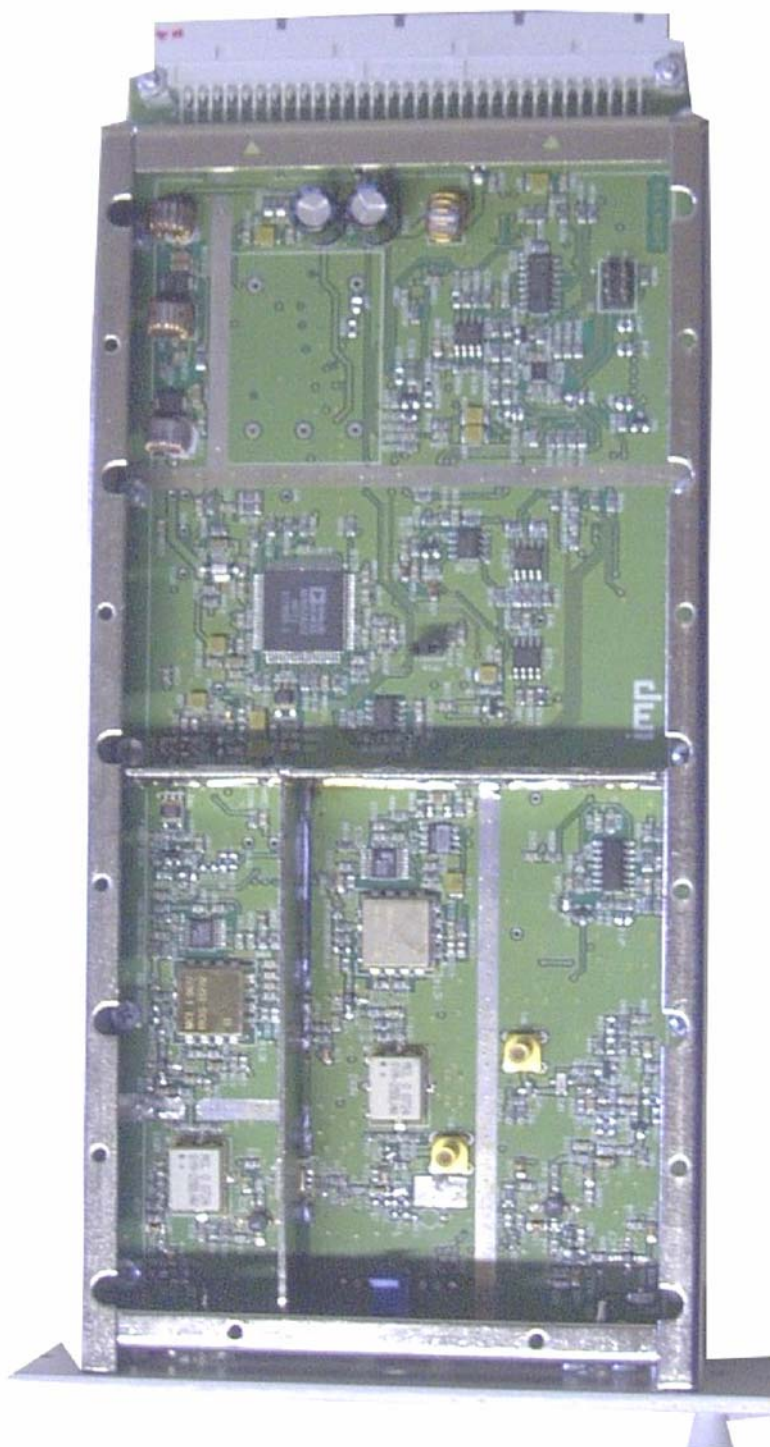
CW signals:	< -50dB at +36MHz from central frequency
Signal connected:	< -55dB at +72MHz from central frequency
Harmonic:	< -50dB
Others:	< -60dB

Power Supply

+26V:	Tolerance : $\pm 4V$	Current Consumption: < 15mA
+12V	Tolerance: $\pm 0.5V$	Max. Current Consumption: AVB 1000mA DVB: 550mA

4. Block diagram for RF Converter IRCD-AVB,DVB





RF Pretvornik IRCD AVB-DVB
RF Converter IRCD AVB-DVB
34125; 34523

	Description:	Stock No.	Page:		File:	
	RF CONVERTER IRCD-AVB	34125	Date:	12.18.07	Disk:	

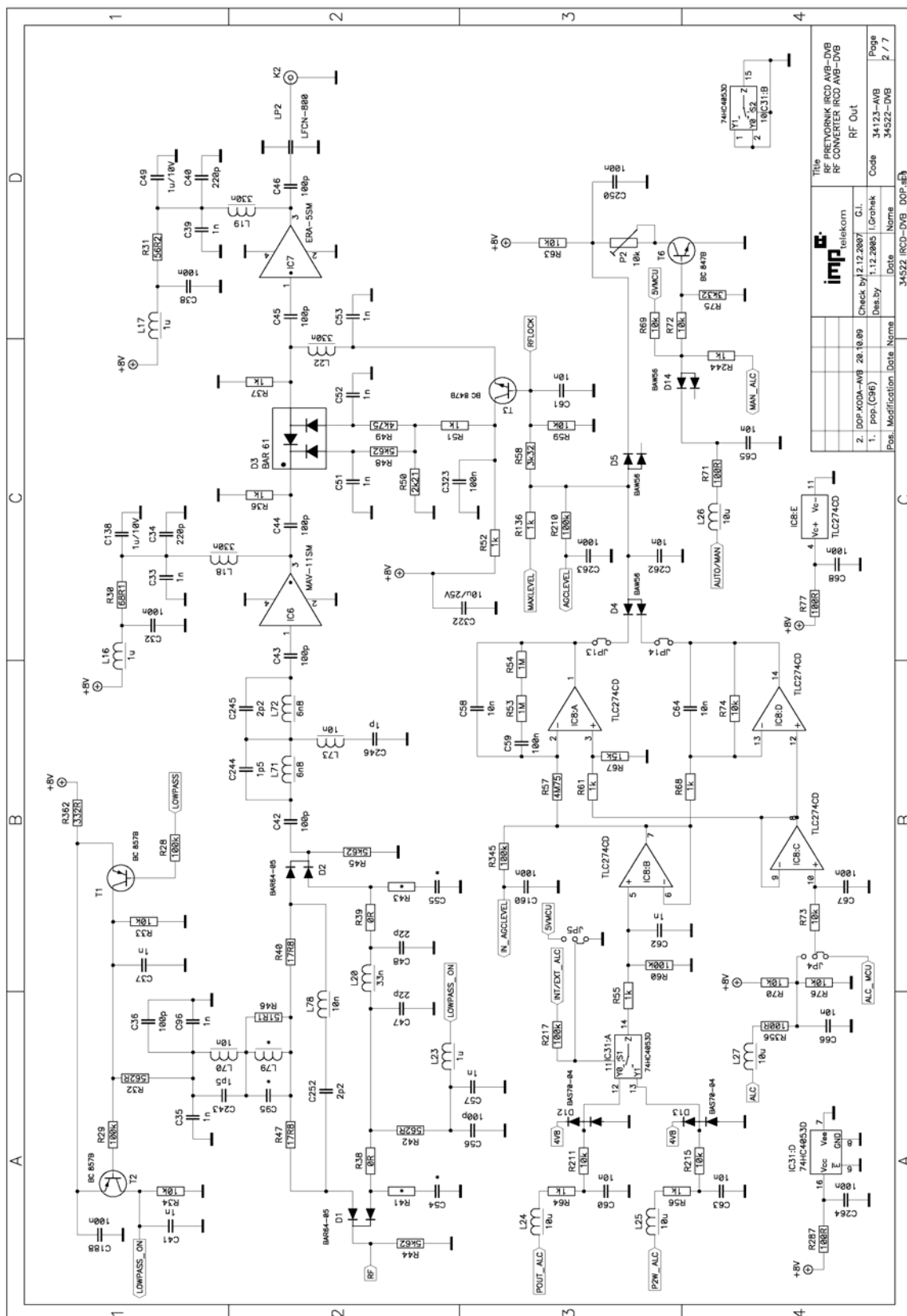
[illegible]

	Designation:	Stock No.	Page:		File:
	PCB RF CONVERTER IRCD-AVB	34123	Date:	11.24.08	Disk:

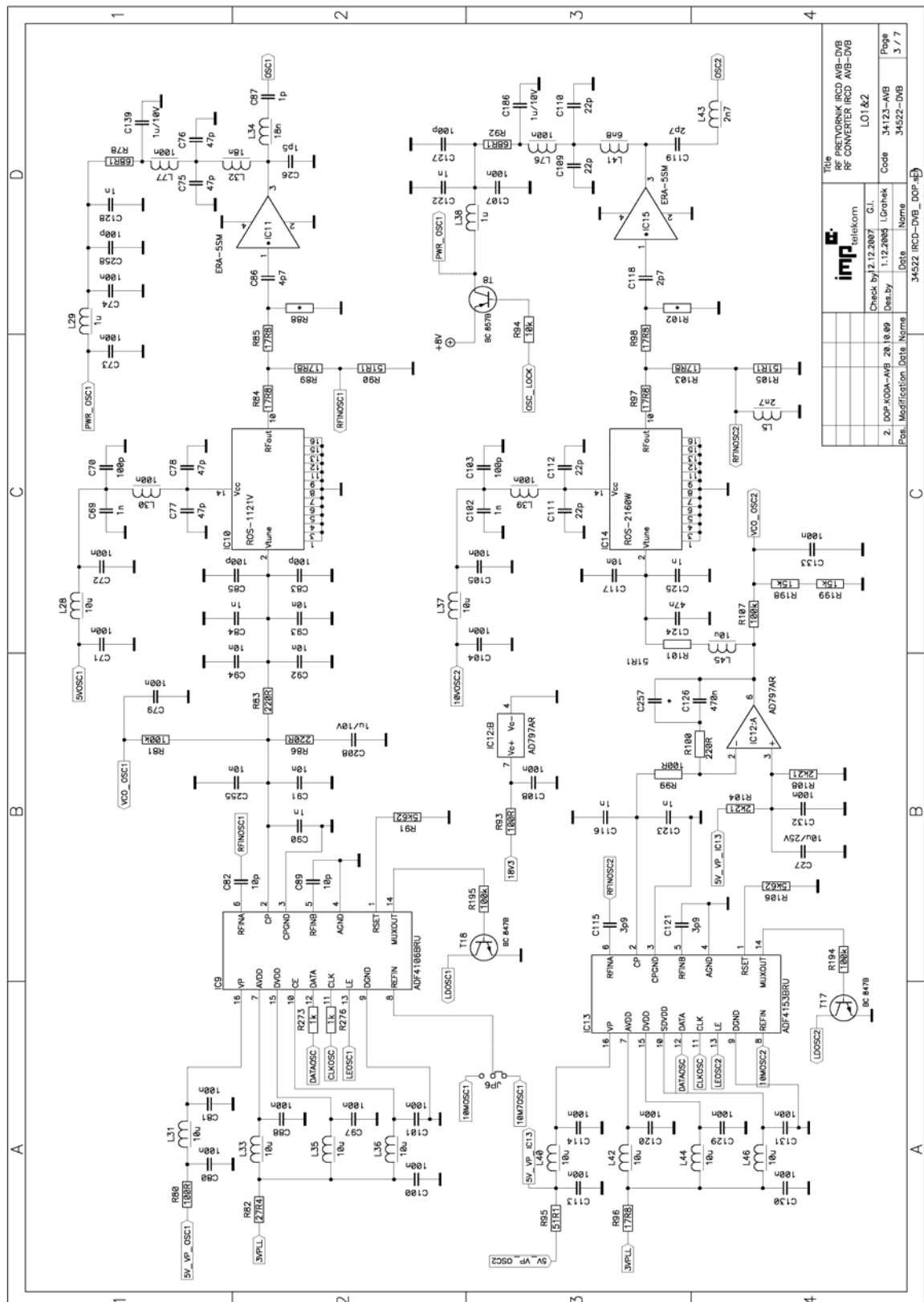
11

Title		34123-AVB RF converter	
Check by		1.12.2007 G.L.	
Des. by		1.12.2007 I.Grohek	
Code		34123-AVB	
Page		1 / 7	

8. Electrical diagram for RF Out



9. Electrical diagram for LO1&2



The image shows a detailed electronic circuit diagram for a radio receiver, specifically a PLL-based FM receiver. The circuit is organized into several functional blocks, each labeled with a letter (A, B, C, D) and a number (1, 2, 3, 4).

Block 1 (A): This section contains the input stage and the first PLL loop. It includes a 10MHz crystal (C149), a 10MHz oscillator (IC17E), and a 10MHz PLL (IC17C). The input signal is coupled through a 10MHz matching network (L49, C145, C146) to the PLL. The PLL output is connected to a 10MHz filter (L51, C157) and a 10MHz amplifier (IC17B).

Block 2 (B): This section contains the second PLL loop and the frequency synthesizer. It includes a 10MHz crystal (C150), a 10MHz oscillator (IC17E), and a 10MHz PLL (IC17C). The input signal is coupled through a 10MHz matching network (L51, C157) to the PLL. The PLL output is connected to a 10MHz filter (L51, C157) and a 10MHz amplifier (IC17B).

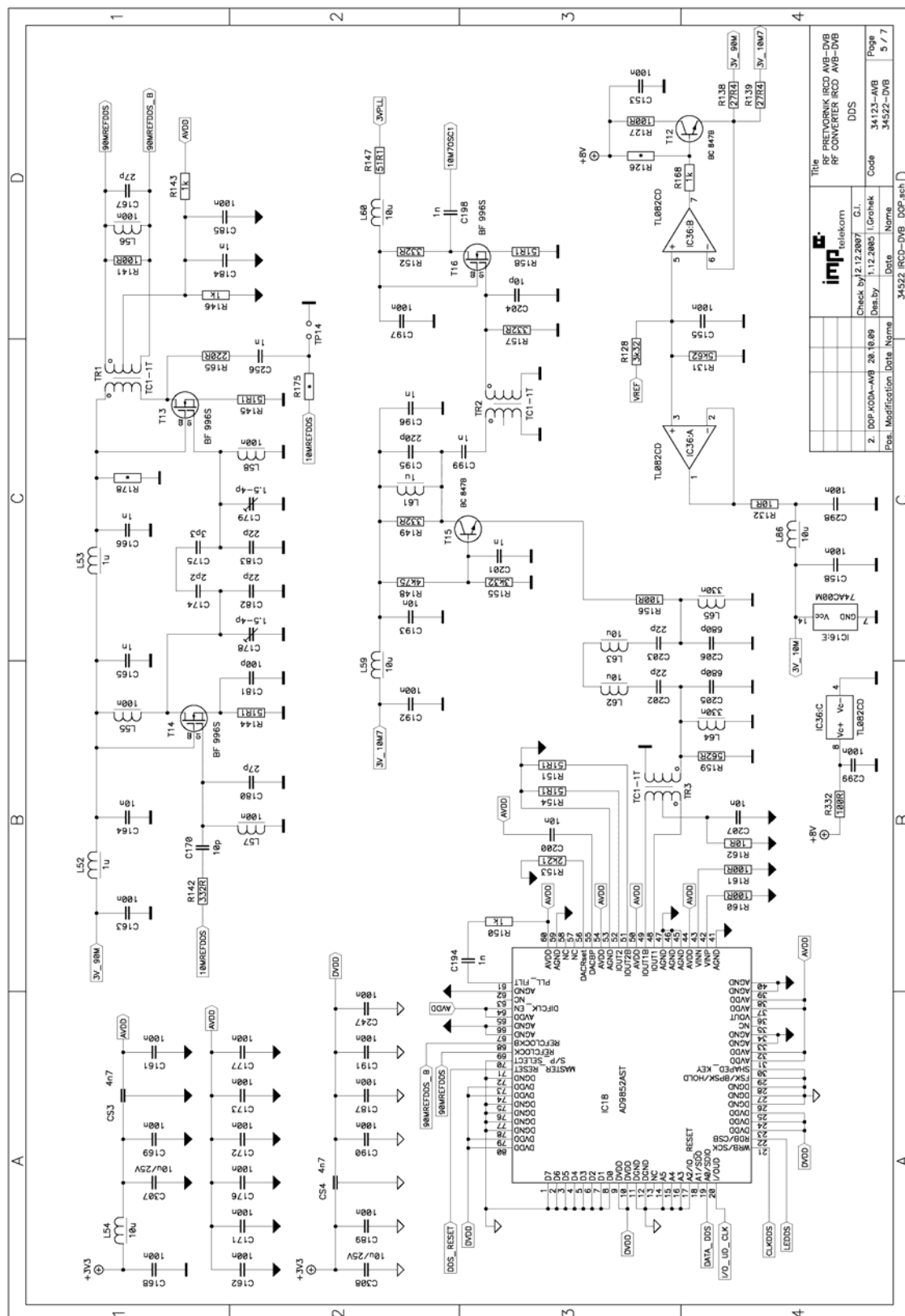
Block 3 (C): This section contains the third PLL loop and the frequency synthesizer. It includes a 10MHz crystal (C150), a 10MHz oscillator (IC17E), and a 10MHz PLL (IC17C). The input signal is coupled through a 10MHz matching network (L51, C157) to the PLL. The PLL output is connected to a 10MHz filter (L51, C157) and a 10MHz amplifier (IC17B).

Block 4 (D): This section contains the output stage and the power amplifier. It includes a 10MHz crystal (C150), a 10MHz oscillator (IC17E), and a 10MHz PLL (IC17C). The input signal is coupled through a 10MHz matching network (L51, C157) to the PLL. The PLL output is connected to a 10MHz filter (L51, C157) and a 10MHz amplifier (IC17B).

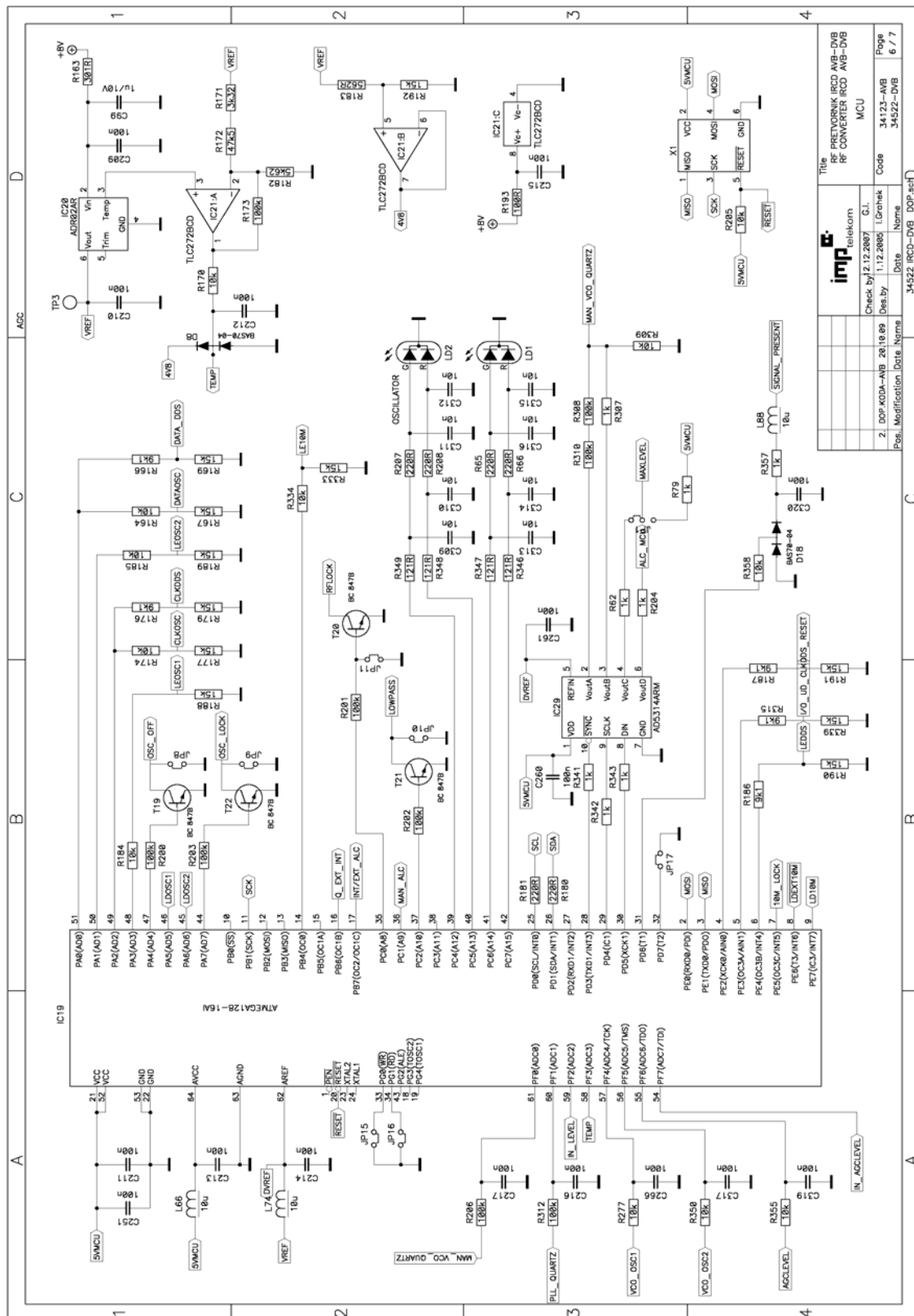
The circuit is powered by a 5V supply (VCC) and a 10V supply (VDD). It includes various passive components such as resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100) and capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100).

The circuit is designed to receive FM signals in the 88-108 MHz range. It features a PLL-based frequency synthesizer, a PLL-based FM demodulator, and a PLL-based FM limiter. The circuit is powered by a 5V supply (VCC) and a 10V supply (VDD). It includes various passive components such as resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100) and capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100).

11. Electrical diagram for DDS



12. Electrical diagram for MCU



Title		imp.e		ten-telekom	
Check by		1.12.2007		G.L.	
Des by		1.12.2007		L.Grehek	
Date		1.12.2007		G.L.	
Pos. Modification		Data		Name	
34522-RCD-DVB-DOP.asd					
2. DOP-KODA-AMB		20.10.09		L.Grehek	
Code		34123-AMB		Page	
34522-DVB				6 / 7	

The image shows a detailed electronic circuit diagram for a power supply system, likely a DC-DC converter. The circuit is organized into several functional blocks, each labeled with a letter (A, B, C, D) and a number (1, 2, 3, 4).

Block A (Left): This section contains the input filter and the first stage of the power supply. It includes a transformer (X2A, X2B) with multiple taps (A1-A12, B1-B12). The circuit features several capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32) and resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100). It also includes a diode (D1) and a transistor (Q1).

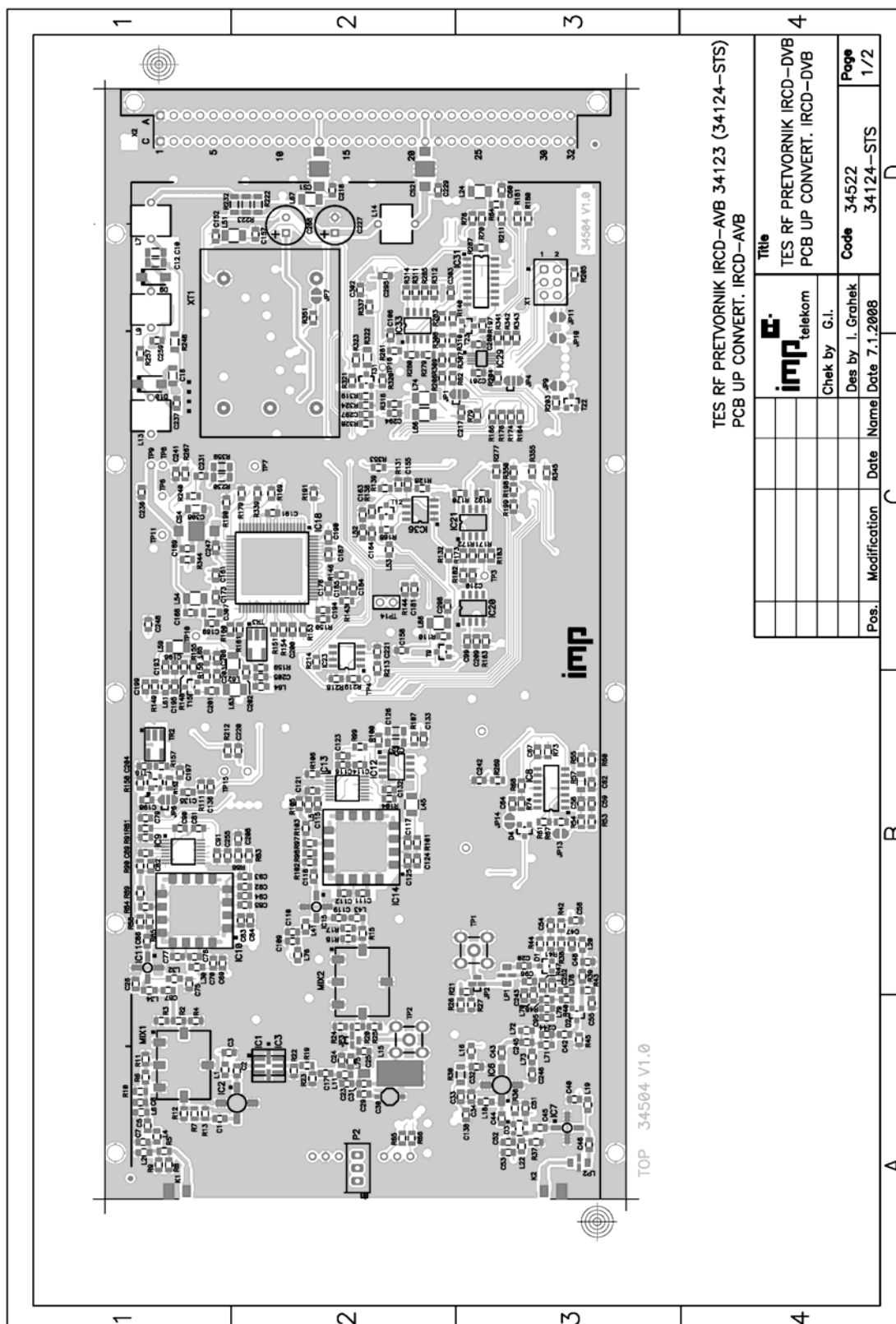
Block B (Middle): This section contains the second stage of the power supply. It includes a transformer (X2A, X2B) with multiple taps (A1-A12, B1-B12). The circuit features several capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32) and resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100). It also includes a diode (D1) and a transistor (Q1).

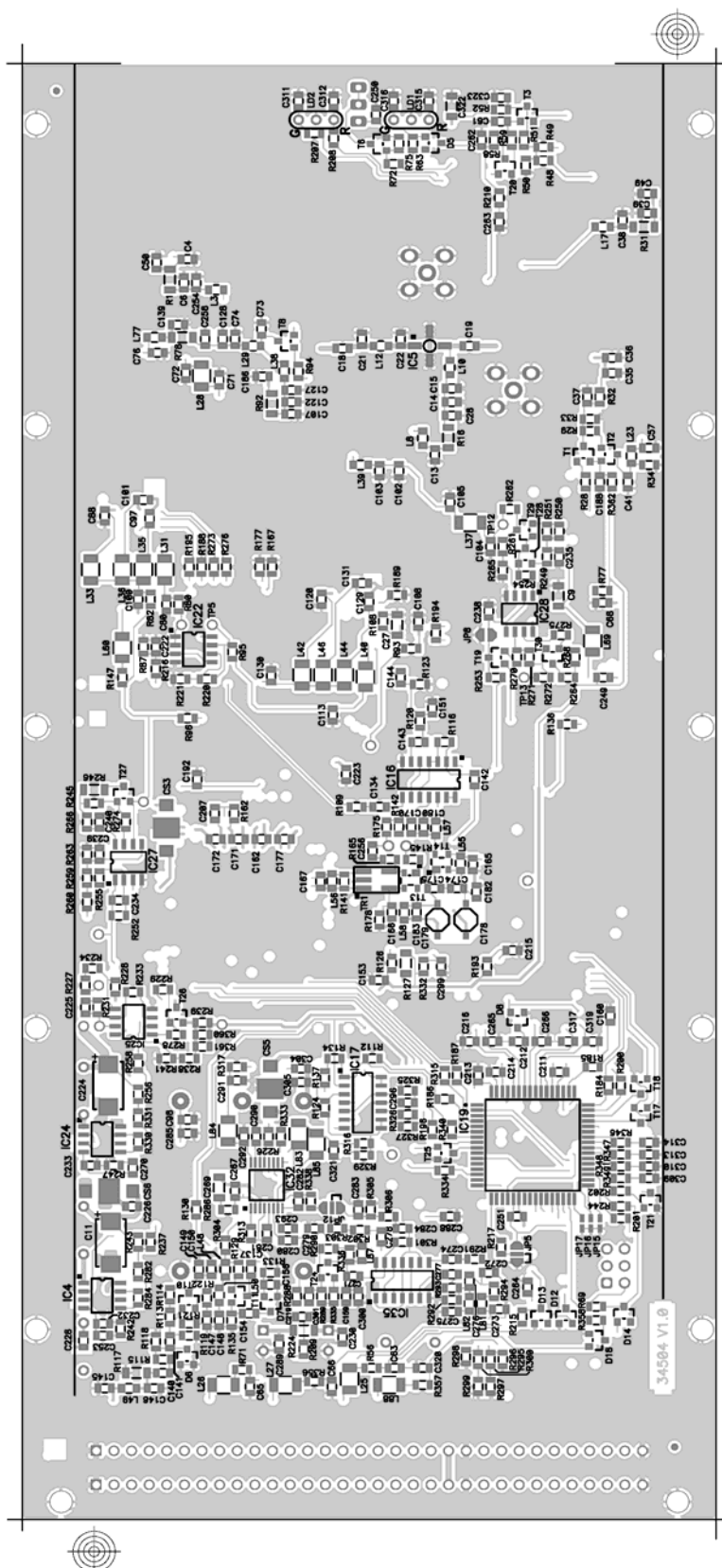
Block C (Right): This section contains the third stage of the power supply. It includes a transformer (X2A, X2B) with multiple taps (A1-A12, B1-B12). The circuit features several capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32) and resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100). It also includes a diode (D1) and a transistor (Q1).

Block D (Bottom): This section contains the fourth stage of the power supply. It includes a transformer (X2A, X2B) with multiple taps (A1-A12, B1-B12). The circuit features several capacitors (C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32) and resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100). It also includes a diode (D1) and a transistor (Q1).

The circuit is powered by a 12V QUARTZ oscillator (Q1) and a 12V VREF reference voltage (VREF). The output of the circuit is a 12V regulated power supply (VOUT).

14. PCB UP Converter IRCD-AVB,DVB





BOTTOM 34503 V1.0

TES RF PRETVORNIK IRCD-AVB 34123 (34124-ST5)

PCB UP CONVERT. IRCD-AVB

TES RF PRETVORNIK IRCD-DVB

PCB UP CONVERT. IRCD-DVB

34522

34124-ST5

2/2

15. Bill of material for PCB RF Converter IRCD-DVB

	Description:	Stock No.	Page:		File:
	PCB RF CONVERTER IRCD-DVB	34522	Date:	6.19.08	Disk:
		34124(STS)			

No.	Pcs.	Description	Stock No.	Signature	Rem./Ven.
2	1	PCB IRCD-Q V1.0	34504		IMP
4	2	IC SMD 74AC00M SO14	6592-385076740	IC16,IC35	ST
5	1	IC AD 797 AR SO-8 AD	33648-385095005	IC12	AD
7	1	IC AD 5314 BRM MSOIC-10	6925-385095021	IC29	AD
8	1	IC AD9852 AST LQFP-80	6813-385088252	IC18	AD
9	1	IC PLL ADF4001 BRU TSSOP-16	6812-385088251	IC32	AD
10	1	IC PLL ADF4106 BRU TSSOP-16	32780-385088248	IC9	AD
11	1	IC SMD 74HC4053D SO16	6583-385075821	IC31	PHILIPS
12	1	IC PLL ADF4153 BRU TSSOP-16	32781-385088249	IC13	AD
14	1	IC ADR02 AR SO8	6815-385088254	IC20	AD
16	1	IC ATMEGA128-16AI TQFP-64	6614-385078428	IC19	ATMEGA
17	2	VOLT. REGUL. DC/DC L5970D (SO-8) ST	34468-385078019	IC4,IC24	ST
18	1	VCO OSCILLATOR 1100-1200MHZ ROS1121V	32784-385086032	IC10	MINI CIRCUIT
20	1	VCO OSCILLATOR 1200-2200MHZ ROS2160W	32785-385086033	IC14	MINI CIRCUIT
22	2	MIXER DOUBLE SYM-25DLHW	32779-385099105	MIX1,MIX2	MINI CIRCUIT
23	4	IC SMD TL 082 CD SO8	6499-385055082	IC22,IC23,IC25,IC36	TI
24	4	IC TLC 272 BCD SO8	6666-385083272	IC21,IC27,IC28,IC33	TI
26	2	IC TLC 274 CD SO14	30984-385083274	IC8,IC17	TI
28	2	MMIC AMPLIFIER MAV-11 SM	6777-385086012	IC2,IC6	MINI CIRCUIT
29	4	MMIC AMPF. SMD HIBRID ERA-5 SM	6796-385086605	IC5,IC7,IC11,IC15	MINI CIRCUIT
34	3	RF TRANSFORMER TC1-1T	32783-385086022	TR1,TR2,TR3	MINI CIRCUIT
35	1	FILTER GSFR TA0232A 1090MHZ	33645-389086132	IC3	GOLLEDGE
38	6	FILTER EMI CHIP 4N7 50V NFM61R30T47	5610-383069470	CS1,CS2,CS3,CS4,CS5,CS6	MURATA
39	2	FILTER LFCN-800 (DC-800MHZ)	33735-389086280	LP1,LP2	MINI CIRCUIT
40	20	TRANS SMD (NPN) BC 847B	6476-385046848	T3,T6,T9,T10,T11,T12,T15,T17,T18,T19,T20,T21,T22,T23,T24,T25,T26,T27,T30,T31	PHILIPS
42	5	TRANS SMD (PNP) BC 857 B	6318-385010856	T1,T2,T8,T28,T29	PHILIPS
44	3	TRANS SMD BF 996 S	6492-385048996	T13,T14,T16	INFINEON
50	2	PIN DIODE SMD BAR 64-05 (SOT23)	31349-385300064	D1,D2	INFINEON

	Description:	Stock No.	Page:		File:
	PCB RF CONVERTER IRCD-DVB	34522	Date:	6.19.08	Disk:
		34124(STS)			

No.	Pcs.	Description	Stock No.	Signature	Rem./Ven.
52	1	PIN DIODE REGULATOR SMD BAR 61 (SO	7170-385300061	D3	INFINEON
54	6	DIODE SMD BAS70-04	7176-385330004	D6,D7,D8,D12,D13,D18	PHILIPS
56	3	DIODE SMD BAW56 SOT23	7179-385330256	D4,D5,D14	PHILIPS
58	2	DIODE STPS2L25 (SMB) ST	34469-385213111	D9,D10	ST
59	2	DIODE LED RD/ZE FI3MM L-93 WEGW	7119-385255039	LD1,LD2	KINGBRIGHT
62	2	CHOKE SIMID 02 100 UH B82422-A110	7575-387802100	L67,L69	EPCOS
64	28	CHOKE SMD SIMID 02 10UH B82422-A1	7596-387902010	L24,L25,L26,L27,L28,L31,L33,L35,L36,L37,L40,L42,L44,L45,L46,L51,L54,L59,L60,L62,L63,L66,L74,L83,L84,L85,L86,L88	EPCOS
66	13	CHOKE SIMID 0805 1UH B82498-B1102	32786-387503100	L3,L8,L16,L17,L23,L29,L38,L52,L53,L61,L81,L82,L87	EPCOS
68	8	CHOKE SIMID 0805 330 NH B82498-B	32793-387502330	L4,L10,L18,L19,L22,L49,L64,L65	EPCOS
69	2	CHOKE SIMID 0805 220 NH B82498-B	32819-387502220	L2,L6	EPCOS
70	8	CHOKE SIMID 0805 100 NH B82498-B	32792-387502100	L30,L39,L55,L56,L57,L58,L76,L77	EPCOS
72	1	CHOKE SIMID 0805 33 NH B82498-B	32791-387501330	L20	EPCOS
74	2	CHOKE SIMID 0805 18 NH B82498-B	32790-387501180	L32,L34	EPCOS
76	6	CHOKE SIMID 0805 10 NH B82498-B	32789-387501100	L1,L11,L12,L70,L73,L78	EPCOS
78	4	CHOKE SIMID 0805 6,8 NH B82498-B	32788-387501068	L41,L71,L72,L75	EPCOS
80	2	CHOKE SIMID 0805 2,7 NH B82498-B	32787-387501027	L5,L43	EPCOS
84	2	CAP TANSMD 100UF 16V E M (LOW ESR)	34470-384652099	C11,C224	KEMET
86	9	CAP SMD 1UF 16V X7R 0805 M	33857-384606104	C28,C49,C50,C98,C99,C138,C139,C186,C208	YAGEO
88	1	CAP SMD 470NF 50V X7R 1206 M	33646-384605472	C126	YAGEO
96	1	CAP SMD 2,2NF 50V CG 0805 K	42033-384603221	CX	YAGEO
98	2	CAP EL 100UF 35V 8X12 R3.5 M	5670-383400041	C227,C268	FROLIT
99	2	CAP TRIM AT 9401-4-SL1 1-4PF	6128-384522401	C178,C179	TEKELEC
101	9	CAP SMD 10UF 25V X5R 1206 K	34472-384607101	C9,C10,C12,C16,C27,C269,C307,C308,322	YAGEO

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102	117	CAP SMD 100NF 50V X7R 0805 M	32942-384605103	C13,C32,C38,C59,C67,C68,C71,C72,C73,C74,C79,C80,C81,C88,C97,C100,C101,C104,C105,C106,C107,C108,C113,C114,C120,C129,C130,C131,C132,C133,C137,C152,C153,C155,C157,C158,C160,C161,C162,C163,C168,C169,C171,C172,C173,C176,C177,C185,C187,C188,C189,C190,C191,C192,C197,C209,C210,C211,C212,C213,C214,C215,C216,C217,C218,C219,C220,C221,C222,C223,C226,C228,C229,C230,C231,C235,C236,C237,C238,C239,C240,C241,C242,C247,C248,C249,C250,C251,C254,C259,C260,C261,C263,C264,C265,C266,C267,C288,C289,C290,C291,C292,C293,C294,C295,C296,C297,C298,C299,C302,C303,C304,C317,C319,C320,C321,C323	YAGEO
104	27	CAP SMD 10NF 50V X7R 0805 K	6212-384604100	C58,C60,C61,C63,C64,C65,C66,C91,C92,C93,C94,C117,C147,C164,C193,C200,C207,C255,C262,C309,C310,C311,C312,C313,C314,C315,C316	YAGEO
105	2	CAP SMD 22NF 50V X7R 0805 K	6216-384604220	C253,C270	YAGEO
106	1	CAP SMD 47NF 50V X7R 0805 K	6217-384604470	C124	YAGEO
108	43	CAP SMD 1NF 50V CG 0805 J	6205-384603100	C6,C14,C33,C35,C37,C39,C41,C51,C52,C53,C57,C62,C69,C84,C90,C96,C102,C116,C122,C123,C125,C128,C142,C143,C144,C154,C165,C166,C184,C194,C196,C198,C199,C201,C225,C234,C256,C271,C278,C282,C284,C285,C305	YAGEO
110	2	CAP SMD 680PF 50V CG 0805 J	6201-384602679	C205,C206	YAGEO

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114	17	CAP SMD 220PF 50V CG 0805 J	6192-384602220	C15,C34,C40,C140,C141,C145,C146,C159,C195,C232,C233,C272,C273,C274,C275,C276,C277	YAGEO
118	24	CAP SMD 100PF 50V CG 0805 J	31142-384602099	C3,C4,C7,C8,C18,C19,C20,C36,C42,C43,C44,C45,C46,C56,C70,C83,C85,C103,C127,C156,C181,C258,C280,C281	YAGEO
120	1	CAP SMD 68PF 50V CG 0805 J	31144-384601679	C5	YAGEO
122	5	CAP SMD 47PF 50V CG 0805 J	31145-384601469	C75,C76,C77,C78,C301	YAGEO
124	2	CAP SMD 27PF 50V CG 0805 J	6177-384601270	C167,C180	YAGEO
126	10	CAP SMD 22PF 50V CG 0805 J	31593-384601219	C47,C48,C109,C110,C111,C112,C182,C183,C202,C203	YAGEO
130	10	CAP SMD 10PF 50V CG 0805 J	31149-384601099	C1,C2,C82,C89,C151,C170,C204,C279,C283,C300	YAGEO
134	2	CAP SMD 4,7PF 50V CG 0805 C	6166-384600470	C86,C150	YAGEO
136	4	CAP SMD 3,9PF 50V CG 0805 C	6165-384600390	C21,C22,C115,C121	YAGEO
138	2	CAP SMD 3,3PF 50V CG 0805 C	6164-384600330	C24,C175	YAGEO
140	3	CAP SMD 2,7PF 50V CG 0805 C	6163-384600270	C25,C118,C119	YAGEO
142	4	CAP SMD 2,2PF 50V CG 0805 C	6161-384600220	C17,C174,C245,C252	YAGEO
146	2	CAP SMD 1PF 50V CG 0805 C	6156-384600100	C87,C246	YAGEO
148	3	CAP SMD 1,5PF 50V CG 0805 C	6158-384600150	C26,C243,C244	YAGEO
158	1	POT 10K 3296-X-1-103	7828-388904001	P2	BOURNS
160	1	RESISTOR SMD 4M75 1206 0,25W 1%	8942-393014470	R57	VITROHM
162	5	RESISTOR SMD 1R 1206 0,25W 1%	8669-392020100	R222,R223,R224,R232,R248	VITROHM
168	2	RESISTOR SMD 56R2 1206 0,25W 1%	8829-393010056	R31,R322	VITROHM
170	8	RESISTOR SMD 68R1 1206 0,25W 1%	8694-392021681	R1,R16,R30,R78,R92,R117,R230,R359	VITROHM
171	2	RESISTOR SMD 100R 1206 0,25W 1%	8833-393010100	R127,R246	VITROHM
178	2	RESISTOR SMD 10M 0805 0,125W 5%	31119-395015100	R231,R252	VITROHM
180	5	RESISTOR SMD 1M 0805 0,125W 1%	32806-395014100	R53,R54,R112,R140,R340	VITROHM

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182	51	RESISTOR SMD 1K 0805 0,125W 1%	31106-395011100	R36,R37,R51,R52,R55,R56, R61,R62,R64,R68,R79,R120, R123,R129,R130,R135,R136, R143,R146,R150,R168,R204, R213,R216,R240,R244,R257, R259,R260,R273,R274,R275, R276,R278,R302,R303,R304, R305,R306,R307,R318,R321, R326,R327,R331,R338,R341, R342,R343,R344,R357	VITROHM
184	4	RESISTOR SMD 2K21 0805 0,125W 1%	32808-395011221	R50,R104,R108,R153	VITROHM
186	8	RESISTOR SMD 3K32 0805 0,125W 1%	31108-395011332	R58,R75,R128,R155,R171,R 234,R284,R330	VITROHM
188	6	RESISTOR SMD 3K92 0805 0,125W 1%	32807-395011392	R254,R263,R280,R285,R289, R325	VITROHM
190	7	RESISTOR SMD 4K75 0805 0,125W 1%	31109-395011475	R49,R87,R119,R148,R220,R 253,R256	VITROHM
192	9	RESISTOR SMD 5K62 0805 0,125W 1%	32809-395011562	R44,R45,R48,R91,R106,R13 1,R182,R218,R228	VITROHM
194	8	RESISTOR SMD 9K1 0805 0,125W 1%	31110-395011910	R166,R176,R186,R187,R242, R243,R282,R315	VITROHM
196	40	RESISTOR SMD 10K 0805 0,125W 1%	31111-395012100	R33,R34,R59,R63,R69,R70, R72,R73,R74,R76,R94,R113, R116,R118,R164,R170,R174, R184,R185,R205,R211,R215, R241,R247,R261,R265,R270, R277,R279,R283,R290,R301, R309,R311,R313,R324,R334, R350,R355,R358	VITROHM
198	17	RESISTOR SMD 15K 0805 0,125W 1%	32810-395012150	R67,R124,R167,R169,R177, R179,R188,R189,R190,R191, R192,R198,R199,R219,R221, R333,R339	VITROHM
200	3	RESISTOR SMD 47K5 0805 0,125W 1%	34529-395012476	R134,R172,R281	VITROHM
202	29	RESISTOR SMD 100K 0805 0,125W 1%	31112-395013100	R28,R29,R60,R81,R107,R11 0,R133,R173,R194,R195,R19 6,R197,R200,R201,R202,R20 3,R206,R210,R217,R226,R23 3,R237,R255,R258,R308,R31 0,R312,R345,R353	VITROHM
203	1	RESISTOR SMD 270K 0805 0,125W 1%	34531-395013270	R286	VITROHM
204	13	RESISTOR SMD 10R 0805 0,125W 1%	32820-395010010	R5,R6,R15,R132,R162,R239, R250,R251,R262,R272,R320, R360,R361	VITROHM

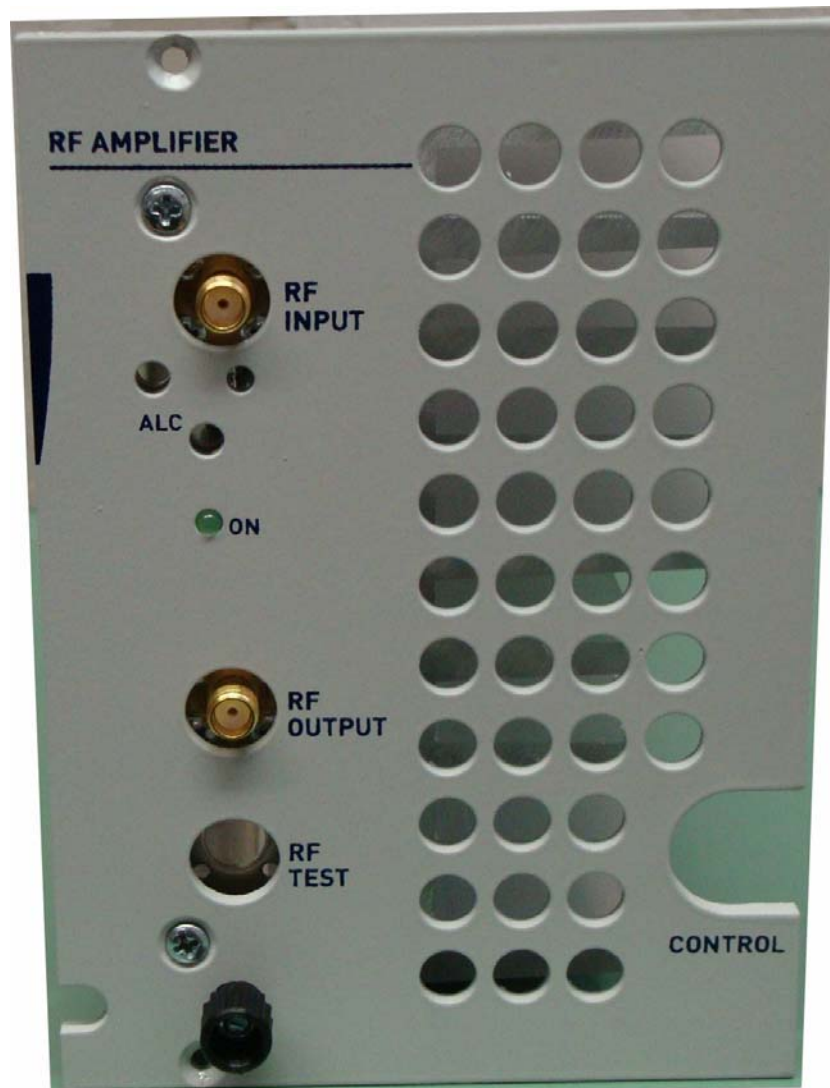
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	PCB RF CONVERTER IRCD-DVB	34522	Date:	6.19.08	Disk:
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No.	Pcs.	Description	Stock No.	Signature	Rem./Ven.
206	15	RESISTOR SMD 17R8 0805 0,125W 1%	32811-395010018	R2,R7,R19,R20,R40,R47,R84,R85,R89,R96,R97,R98,R103,R295,R300	VITROHM
208	5	RESISTOR SMD 27R4 0805 0,125W 1%	32812-395010027	R82,R138,R139,R316,R329	VITROHM
212	17	RESISTOR SMD 51R1 0805 0,125W 1%	32814-395010051	R21,R46,R90,R95,R101,R105,R122,R144,R145,R147,R151,R154,R158,R227,R264,R288,R337	VITROHM
214	26	RESISTOR SMD 100R 0805 0,125W 1%	31113-395010100	R71,R77,R80,R93,R99,R115,R141,R156,R160,R161,R193,R209,R212,R214,R266,R267,R269,R287,R291,R292,R314,R317,R328,R332,R335,R356	VITROHM
216	8	RESISTOR SMD 121R 0805 0,125W 1%	32815-395010121	R26,R27,R121,R249,R346,R347,R348,R349	VITROHM
218	13	RESISTOR SMD 220R 0805 0,125W 1%	31114-395010220	R65,R66,R83,R86,R100,R163,R165,R180,R181,R207,R208,R293,R294	VITROHM
220	12	RESISTOR SMD 301R 0805 0,125W 1%	32816-395010301	R3,R4,R12,R13,R22,R23,R24,R25,R296,R297,R298,R299	VITROHM
222	6	RESISTOR SMD 332R 0805 0,125W 1%	32817-395010332	R142,R149,R152,R157,R336,R362	VITROHM
224	10	RESISTOR SMD 511R 0805 0,125W 1%	31126-395010511	R8,R9,R10,R11,R17,R18,R14,R238,R271,R319	VITROHM
226	5	RESISTOR SMD 562R 0805 0,125W 1%	32818-395010562	R32,R42,R137,R159,R183	VITROHM
230	2	RESISTOR SMD 0R 0805 0,125W 1%	34532-395010000	R38,R39	VITROHM
240	2	CONNECTOR MINI FOR PCB 59S-101-400-D3 R	4612-373905310	TP1,TP2	ROSENBERG
242	1	CONNECTOR ANGLE 64-P (M) STV-C-64-M-AC	4795-373908368	X2	ERNI
244	0.10	SQUARE-PIN 2-VR 2X36P M2.54 SL22 112 G	4663-373908157	X1	FISCHER
248	0.06	SQUARE-PIN 1-VR 36-P F 2.54 BL 1	4658-373908152	TP14	FISCHER
250	2	COIL TOROID 27UH	34548-801520276	L7,L14	IMP
252	1	COIL TOROID 68UH	34549-801520277	L9	IMP
254	1	COIL TOROID 135UH	34550-801520278	L13	IMP

3.6 RF Power Amplifier 2-20W RFA VHF

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3.6 RF Amplifier VHF RFA-302



1. General description

RF POWER AMPLIFIER VHF

El.diagram:	A-302;	803611464
	A-302 V.3	803611618
	A-302 V.2	803611544
	A-310;	803611619

The output power stage is incorporated in the standard rack of the basic stage of OTVP-3.... Through minor modifications and additions, it can be used as »driver« or as final stage in the range 1 to 25W.

As the basic power amplifier, a two-stage amplifier TDE025VHF is being used.

Basic technical data:

- Gain	34dB
- Frequency range	174...230MHz
- Max. sync power	25W
- Supply voltage	28V
- Power consumption	3,4 A

In the case when is being used for output power of 25W, a HELA 10 amplifier is additionally provided at the output. This increases the gain of the entire module by approx 36dB. Additional supply voltage +12V/350mA is necessary.

Both supply voltages (28V, 12V) are connected by means of a 32-pole connector.

In the case when there is no input signal, the power amplifier is OFF. The ON/OFF status is indicated by a green LED on the front panel (»ON«).

The unit is additionally provided with cooler temperature measurement (Th...). In the case of overheating, the processor will stop the power amplifying module.

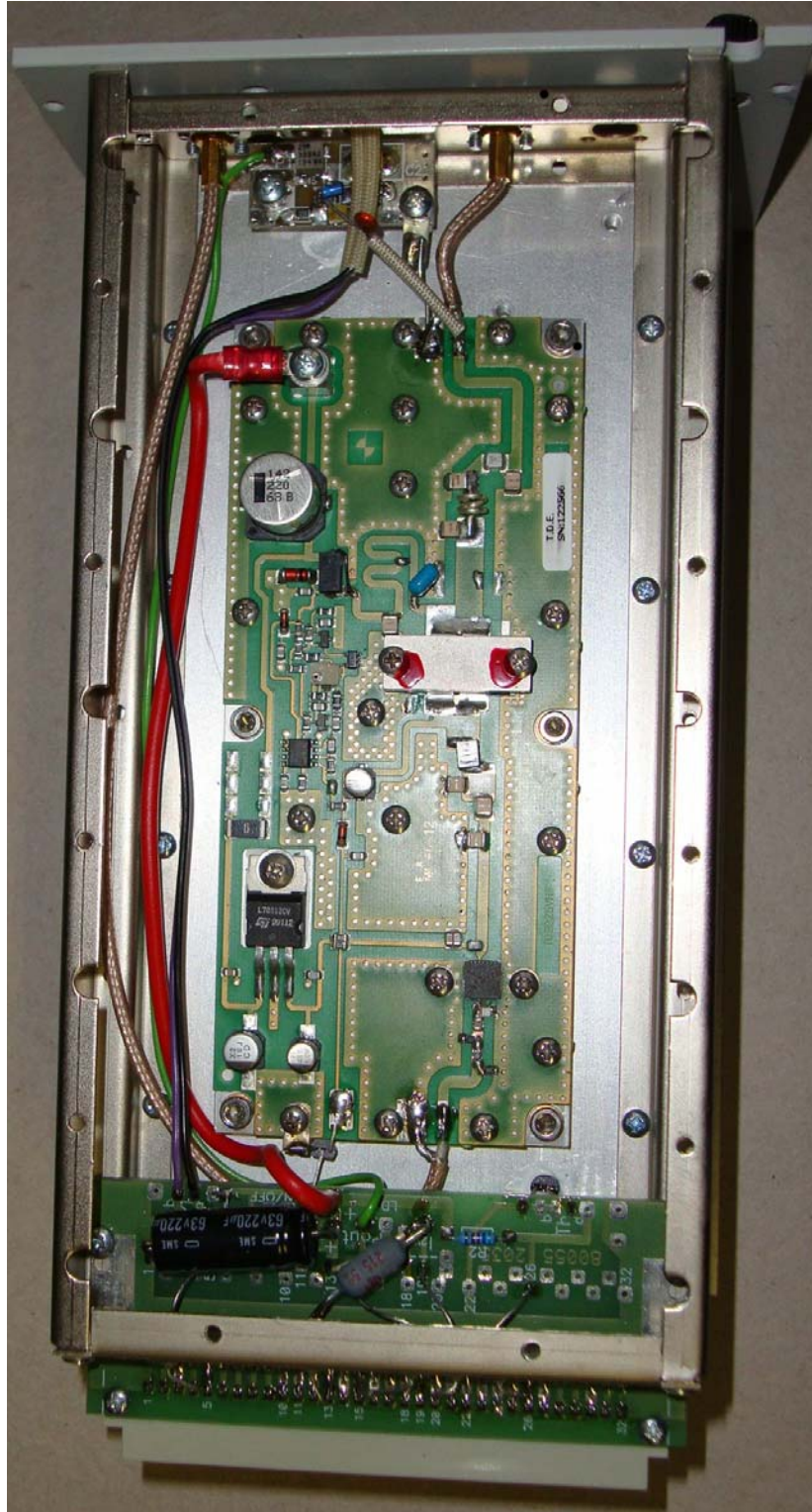
Power module current measurement is ensured indirectly, by measuring the voltage drop at the resistor in the 28V circuit, and the signal is applied to the contact 19 of the 32-pol. connector.

Whenever OTVP-3/... , (RFA-3....) is used as the »Driver« for the power stages as 100W or 50W, »PCB RFA-VHF« is additionally provided at the output for separate metering of Pout. ALC signal is obtained from a directional coupler which is provided at the output from OTVP-3.

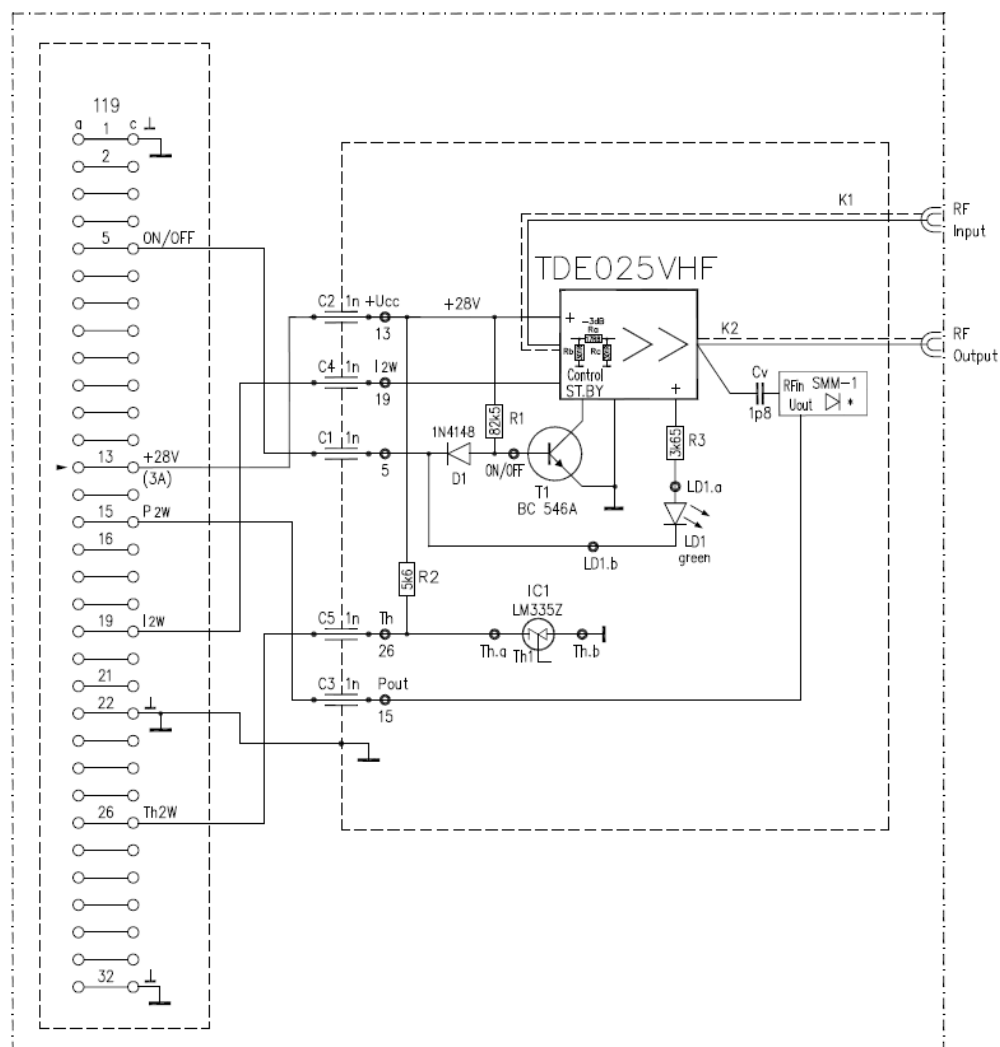
MAINTENANCE:

Special maintenance for the RF power amplifier is not necessary.

RF Power amplifier VHF A-302 V4.0



2. Electrical diagram RF Amplifier 2-20W VHF



BC 546A

T0-92
Bottom View

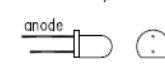
T1

LM335Z

T0-92
Bottom View

IC1

L-934 GD/B



LD1

The specification herein are subject to change due to the technical improvements without notice!

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The drawing illustrates the RF Amplifier RFA-302, showing both the external front panel and the internal chassis layout. The front panel includes an RF amplifier section with input, output, and test points, along with control buttons for ON, A.L.C., and RF. The internal chassis houses a TDE025VHF tube and various electronic components, with numerous callout numbers (1-52) pointing to specific parts and features.

4. Bill of material (general)

	Designation:	Stock No.:	Page:		File:	
	RF AMPLIFIER VHF RFA-302 V.2 (PTVP)	803611544	Date:	10.4.2001	Disk:	
	RF AMPLIFIER VHF RFA-310 (OTVP)	803611619				

No.:	Pcs.	Designation:	Stock No.:	Alt	Note	Rem / Ven
1	1	LIN. PALLET AMPLIFIER 25W VHF TDE025VHF	389005013			TDE
2	1	FRONT PLATE RFA-P	800141311		(at code 803611544)	IMP
2	1	FRONT PLATE RFA	800141298		(at code 803611619)	IMP
11	1	HEATSINK RFA 302/1	800800648		(at code 803611544)	IMP
11	1	HEATSINK RFA 300/2	800800675		(at code 803611619)	IMP
25	1	CAPACITOR SMD X7R 1210 50V 100NF	384605100		C6	YAGEO
26						
27	1	PCB CONNECTOR 1	803561581			IMP
29	1	TRANSISTOR BC 546A	385010546		T1	MOTOROLA
32	5	LEAD THROUHG CAPAPACITOR BDBQ5 02 160V 1NF - 20+100%	383068100		C1,C2,C3,C4,C5	ISKRA
33	1	RESISTOR SMD 1206 1% 0,25W 17R8	393010018		Ra	VITROHM
34	2	RESISTOR SMD 1206 1% 0,25W 301R	393010300		Rb, Rc	VITROHM
36	1	DIODE LED GREEN F13MM L-934 GD/B	385255037		LD1	KINGBRIGHT
40	1	CABLE RFA-302 INPUT V.2	801570879		K1	IMP
41	1	CABLE RFA-302 OUTPUT V.2	801570880		K2	IMP
42	1	CABLE RFA-302 K3	800570399		K3	IMP

5. Technical characteristics for TDE25VHF



Charateristics

- 170 – 230 MHz
- Pout: 10 W DVB-T Signal
- Pout: 20 W ps. Analog Tv
- Gain: 35dB
- 50 Ohm in/out Impedance
- Classe AB Operation
- Device: 1 x ECG008 + MRF6VP2150
- Supply: 48 Vdc nominal (28 to 48 Vdc)
- High temperature protection
- Dimension: (LxWxH) 60x140x30mm 2.36"x5.51"x1.18"
- Weight: 0.130Kg / 0.29lb

Applications

- Broadcast transmitter
- Industrial application
- Research & Development
- scientific equipments
- Test and validation

Benefits

- Excellent ruggedness
- High power density
- High power gain
- High efficiency
- Low performance spreading, unit to unit



TDE025VHF

Power Amplifier Section 20W VHF

Image not available

TDE025VHF is an high linear amplifier, designed to work in the entire band 170-230Mhz, with relevant power level in most common transmission standard.

TDE025VHF incorporates a fully printed network with Microstrip and Stripline technology that match the latest generation of LDMOS power devices, making this amplifier the technology state of art .

Electrical Specification

Parameter	Min.	Typ.	Max.	Units.	Note
Frequency Range	170		230	MHz	
Power gain	33	35		dB	
Analog tv power Imd < -50 dBc (G std red field common amp)	20	25		Wps	Without precorrection
DVB-T power Shoulder <-33 dBc	10	15		Wrms	Without precorrection
ATSC DTV Shoulder < -40dBc from carrier	10	15		Wrms	Without precorrection
Supply Voltage		50		V	
Efficiency 10W DVB-T	10	12		%	
Efficiency 20W Analog	20	25		%	
Power Out 1dBc	40	50		W	Note 5
Quiescent Current		0.7		Amps	Note 3
Curren Consumption Analog Tv (blak field)			2,5	Amps	Pout 25W ATV

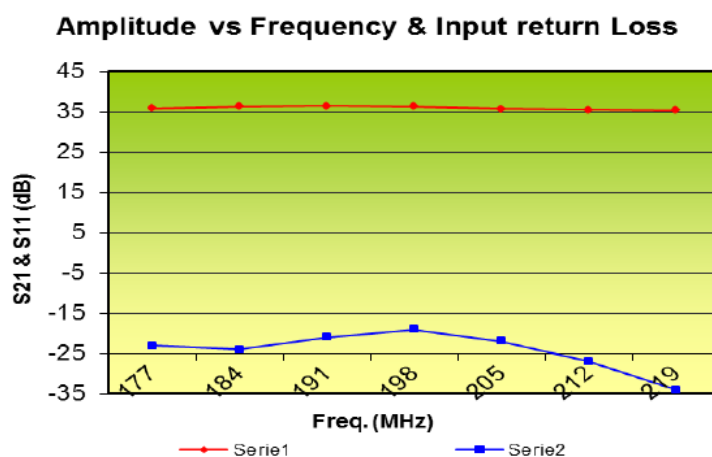


TDE025VHF

Power Amplifier Section 20W VHF

Gain Low Level

- Test Condition Vcc 50V Idq= 450mA
- Amplitude vs Frequency
- Return Loss



ANALOG Power

- Test Condition Vcc 50V Idq= 450mA
- IMD @ Pout 20W ps. Red Field Without Precorrection

CH.	Freq. (MHz)	IMD	Idst (A)
05	177	-52	1.3
06	184	-53	1.4
07	191	-53	1.3
08	198	-54	1.2
09	205	-53	1.2
10	212	-52	1.2
11	219	-50	1.1

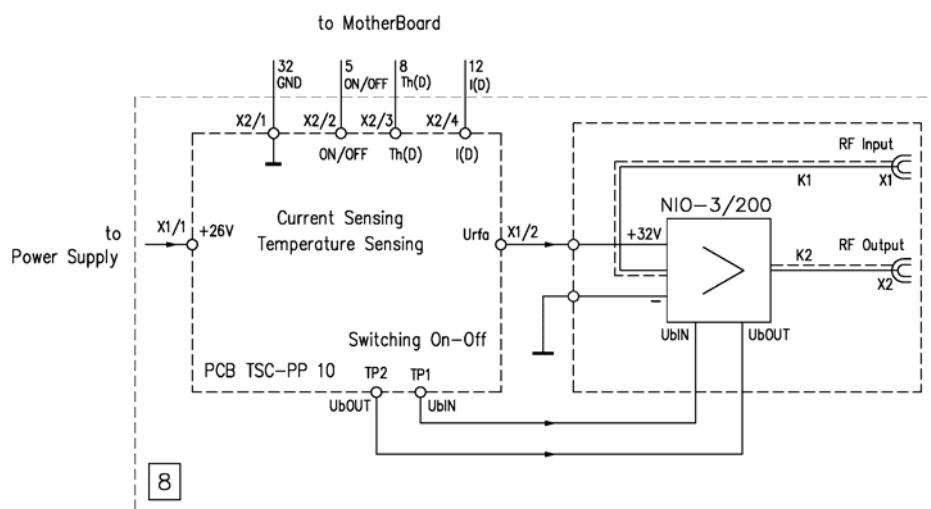
- Test Condition Vcc 28V Idq= 450mA
- IMD @ Pout 20W ps. Red Field Without Precorrection

CH.	Freq. (MHz)	IMD	Idst (A)
05	177	-48	1.5
06	184	-49	1.6
07	191	-48	1.6
08	198	-49	1.5
09	205	-48	1.6
10	212	-47	1.6
11	219	-47	1.5

3.7 RF Power Amplifier 100W A-3100 VHF

1. Block diagram for A-3100 VHF	2
2. Assembly for A-3100 VHF	3
3. Bill of material for A-3100 VHF	4
4. General description for Power Amplifier NIO-3/200	6
5. Electrical diagram for Power Amplifier NIO-3/200	8
6. PCB Power Amplifier NIO-3/200	9
7. Bill of material for PCB Power Amplifier NIO-3/200	10
8. Electrical diagram and PCB TSC-PP 10	11
9. Bill of material for PCB TSC-PP 10	12

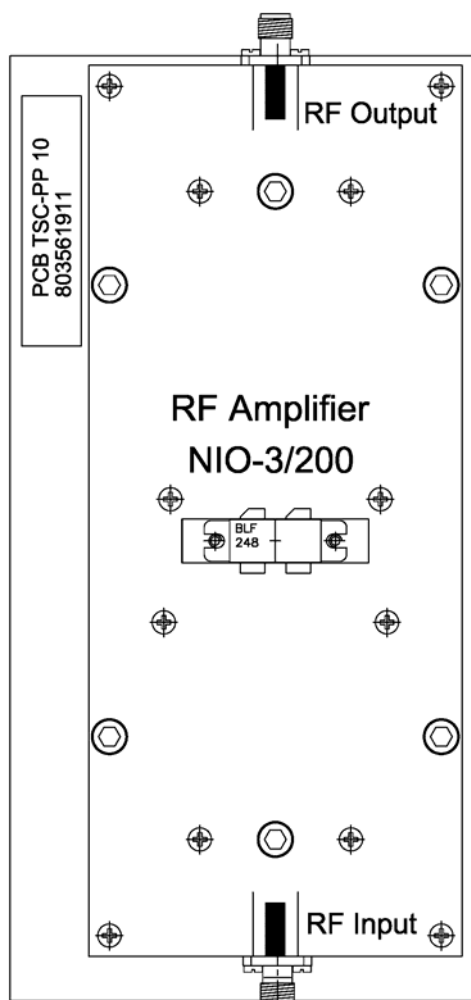
1. Block diagram for A-3100 VHF



The specification herein are subject to change due to the technical improvements without notice!

					RF Amplifier 100W VHF RFA - 3100	
2		VII.2007	J.Z.			
	R.1.1	VI.2004	J.Z.	Name	RFA3100	27380 - 803611626
Date	Modification	Date	Name	Date	2007-07-18	
						Page 1/1

2. Assembly for A-3100 VHF



The specification herein are subject to change due to the technical improvements without notice!

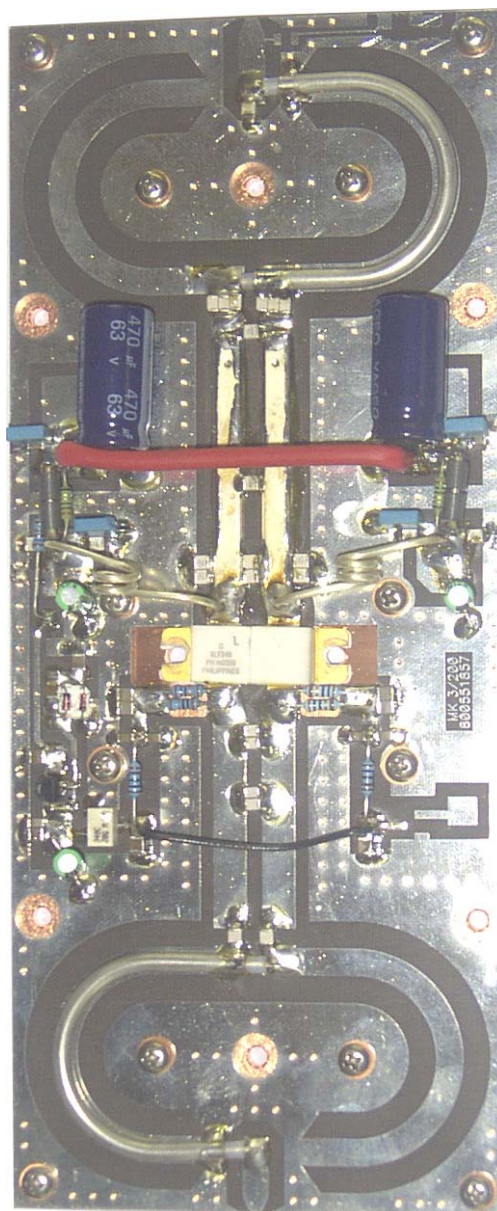
						RF Amplifier 100W VHF RFA - 3100	
2		VII.2007					
	R.1.1	VI.2004		Name	RFA3100	27380 - 803611626	
Pos.	Modification	Date	Name	Date	2007-07-18		
						Page	1/1

3. Bill of material for A-3100 VHF

	Designation:	Stock No.:	Page:		File:	
	RF AMPLIFIER RFA 3050	803611626	Date:	20.6.2002	Disk:	

No.	Pcs.	Designation:	Stock No.:	Alt	Note	Rem / Ven
1	1	HEATSINK RFA-3200	800800605			IMP
2	1	PCB AMPLIFIER STAGE NIO-3/200 (completion)	801560131			IMP
	1	PCB AMPLIFIER STAGE NIO-3/200	803561746			IMP
3	1	PCB CONTROL TSC-PP-10	803561911			IMP
4	1	RESISTOR SMD 1206 1% 0,25W 1K3	393011130		R11	

RF Amplifier module VHF NIO-3/200
RF Ojačevalna kaseta VHF NIO-3/200



4. General description for Power Amplifier NIO-3/200

SOLID STATE AMPLIFIER NIO-3/200

Electric diagram: 80356 1746

Description:

The amplifying cassette *NIO-3/200* is a solid state broadband VHF amplifier class AB. It consists of RF part, with the transistor BLF248 as the basic amplifying element, and of power supply. The transistor BLF248 is a dual push/pull MOSFET transistor manufactured by Phillip&

RF signal is led through the INPUT connection field and applied to the impedance transformer Li, which transforms the symmetrical input line into nonsymmetrical line. Thus, two identical guide lines are obtained through which the signal is led to Gate1 and Gate2 of the transistor BLF248 (push/pull mode of operation). The amplified signal is applied to the impedance transformer L6, which transforms the nonsymmetrical line into symmetrical line. The signal is tapped at the OUTPUT connection field.

The working points are set by potentiometers P1 and P2. The voltage at TP4 and TP5 are set to 3-4V. This current setting is performed during the process of tuning the unit.

DI demodulates the signal, which is led to the TEST OUTPUT connection field. RIO and Ri 1 ensure the appropriate level at the anode of DI and thus at the output.

Adjusting:

The amplifying module is tuned and tested by the manufacturer for all channels in III. Band

Troubleshooting:

In the case of faulty operation check the supply voltages at Gate 1 and Gate2, and Drain 1 and Drain2 of the transistor BLF248. The values of individual voltages are shown in electric diagram. Although voltages have been set correctly, faulty operation may occur as the result of out-of-tune tuning circuits. In such case, it is necessary to measure input and output matching values and gain. When replacing the cassette, it is necessary to coat the interfacial surface between the transistor BLF248 and the cooling element with the thermal compound. **IMPORTANT:** The transistor BLF248 must first be mechanically fixed to the base and soldered afterwards. Whenever the transistor has been replaced, the cassette should be tuned again. Faulty cassettes should be repaired by the manufacturer.

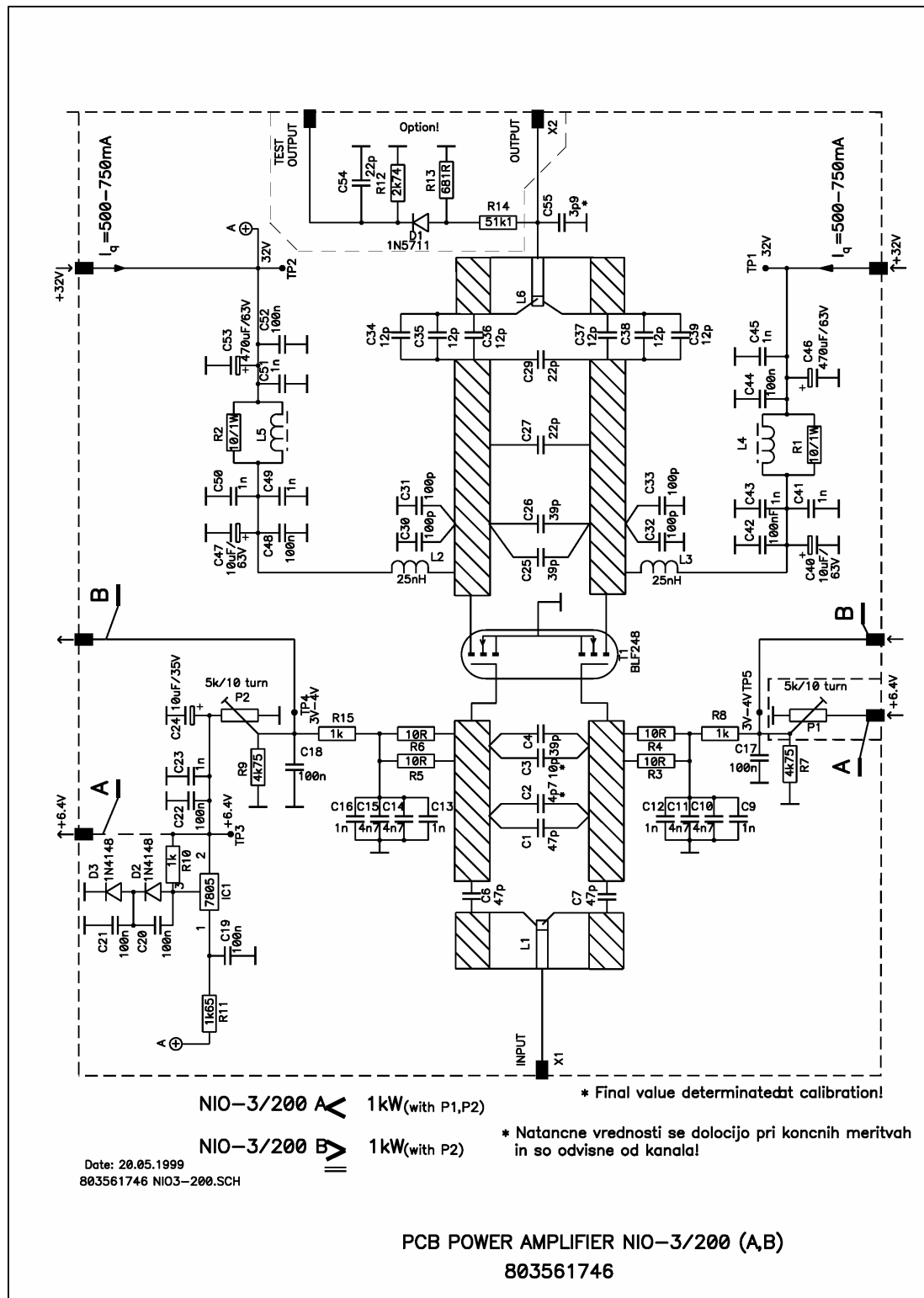
Maintenance:

No maintenance is required.

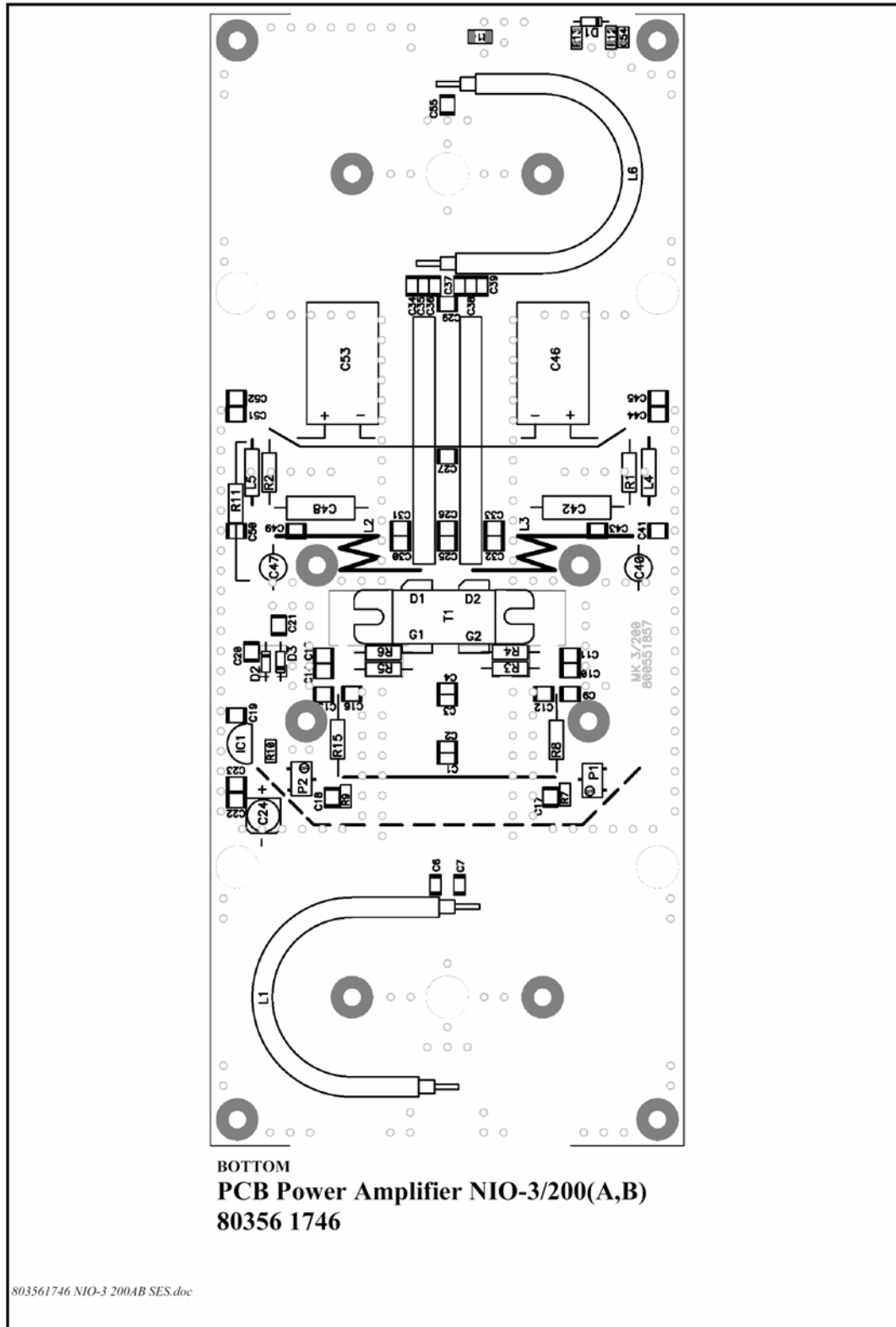
Technical data:

Frequency range	174MHz ÷ 230MHz
Gain	12dB ± 0,5dB
Output power	200W sync
Input – output impedance	50 ohm
Input matching	5dB ÷ 10dB
Output matching	>18dB
Supply voltage	+32V
Current consumption	8 - 9A
BIAS current	2 x 250mA ÷ 450mA

5. Electrical diagram for Power Amplifier NIO-3/200



6. PCB Power Amplifier NIO-3/200

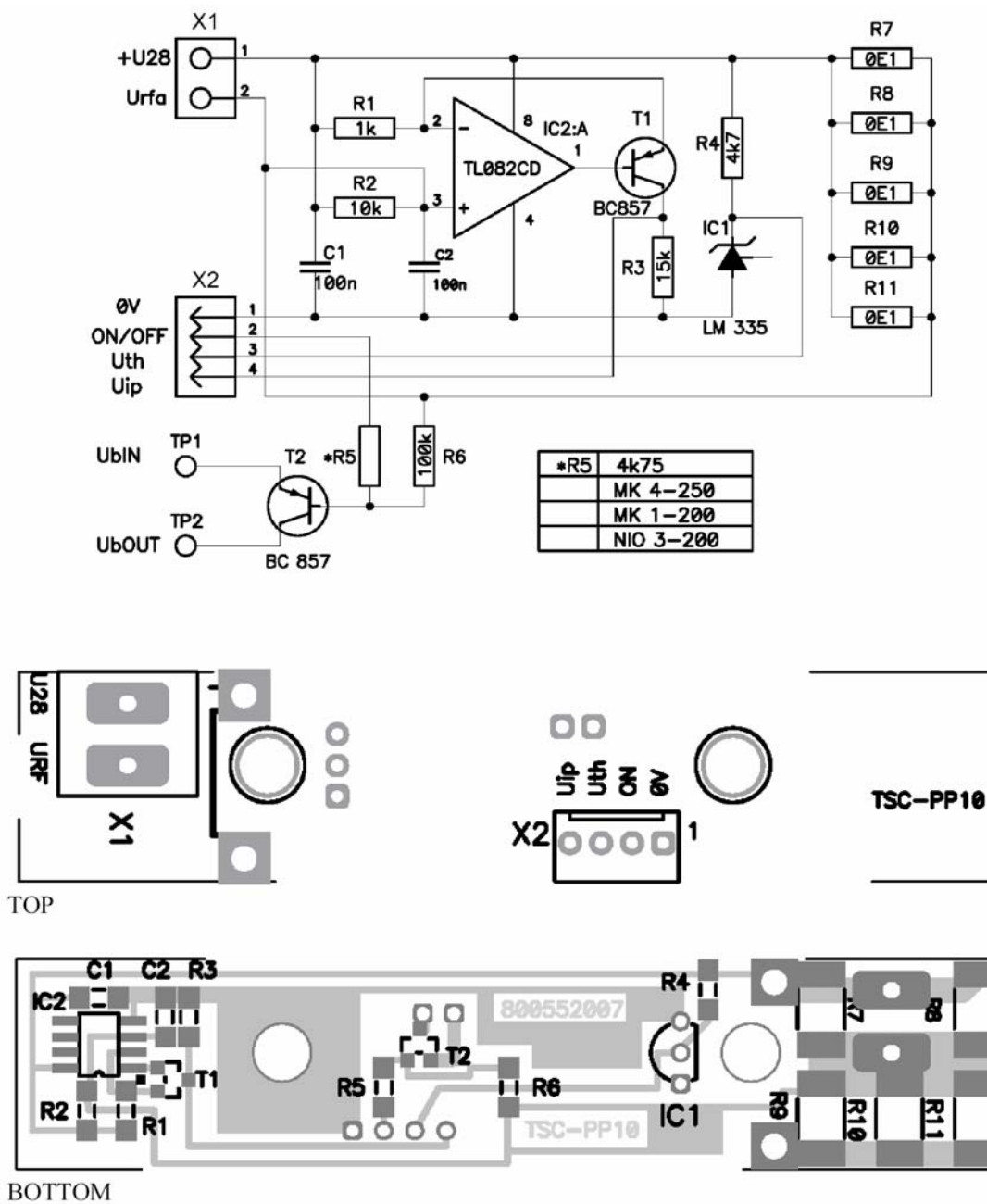


7. Bill of material for PCB Power Amplifier NIO-3/200

	Designation:	Stock No.:	Page:	TNIO3200 A	File:	
	PCB AMPLIFIER CASSETTE NIO-3/200 (A, B)	803561746	Date:	26.09.2002	Disk:	

No.	Pcs.	Designation:	Stock No.:	Alt	Note	Rem / Ven
1	1	PCB AMPLIFIER CASSETTE MK3/200	800551857			IMP
2	4	CAPACITOR CHIP 100B-101-JP-500 100PF	384336100		C30,C31,C32,C33	ATC
3	3	CAPACITOR CHIP 100B-390-JP-500 39PF	384335139		C4,C25,C26	ATC
4	6	CAPACITOR CHIP 100B-120-JP-500 12PF	384336103		C34,C35,C36,C37,C38,C39	ATC
5	1	CAPACITOR CHIP 100B-3R9-CP-500 3P9	384336105		C55	ATC
6	1	CAPACITOR CHIP 100B-4R7-CP-500 4P7	384336111		C2	ATC
7	1	CAPACITOR CHIP 100B-100-JP-500 10PF	384335110		C3	ATC
8	3	CAPACITOR CHIP 100B-470-JP-500 47PF	384335147		C1,C6,C7	ATC
9	4	CAPACITOR CHIP 100B-102-KP-50 1NF	384337100		C41,C43,C49,C50	ATC
10	2	CAPACITOR CHIP 100B-220-JP-500 22PF	384335122		C27,C29	ATC
11	7	CAPACITOR SMD CG 1206 K 50V 1NF	384602999		C9,C12,C13,C16,C23,C45,C51	ATC
12	6	CAP. SMD X7R 1210 AVX 12101C104KAT2A 100V 100NF	384605102		C17,C18,C19,C20,C21,C22	ATC
13	4	CAPACITOR PLASTIC 2,5X7,5 RD 63V K 100NF	383925100		C42,C44,C48,C52	ISKRA
14	2	CAPACITOR ELKO 12X30 RD 63V M 470UF	383404004		C46,C53	ROEDERSTEIN
15	3	CAPACITOR ELKO 5X12 RD 63V M 10UF	383400071		C24,C40,C47	ROEDERSTEIN
17	4	CAPACITOR SMD CG 1210 M 50V 4N7	384610472		C10,C11,C14,C15	YAGEO
19	4	RESISTOR MFILM MAX 2.7X8MM 1% 10R	391012100		R3,R4,R5,R6	VITROHM
20	2	RESISTOR MFILM MAX 2.7X8MM 1% 1K	391014100		R8,R15	VITROHM
21	2	RESISTOR MOFILM MAX 5X15 2% 10R	391342100		R1,R2	VITROHM
27	2	RESISTOR SMD 1206 1% 0,25W 4K75	393011479		R7,R9	VITROHM
28	1	RESISTOR MFILM MAX 2.7X8MM 1% 1K65	391014165		R11	VITROHM
29	1	RESISTOR SMD 1206 1% 0,25W 1K	393011100		R10	VITROHM
30	2	DIODE 1N 4148	385270148		D2,D3	DIOTEC
33	2	POTENTIOMETER 3269W-1-502 5K	388512251	A	P1,P2	BOURNS
33	1	POTENTIOMETER 3269W-1-502 5K	388512251	B	P2	BOURNS
37	1	VOLTAGE REGULATOR UA 78L05 AWY (TO-92)	385078005		IC1	NSC
38	1	TRANSISTOR BLF 248	385034048		T1	PHILIPS
40	1	COIL L2	800500800		L2	IMP
41	1	COIL L3	800500801		L3	IMP
45	2	CABLE NIO-3/200-1	800570362		L1, L6	IMP
47	2	COIL	801500570		L4,L5	IMP
48	0,1M	WIRE Li7Y TEFLON 900V 0,34MM2 7X0,25	305220035			EN
50	2	PLATE 47X5X1	800310183			IMP
51	1	LINING 3/200	800490674			IMP
62	2	CONNECTOR 23 SMA 50 0 44	373905123		K1,K2	SUHNER

8. Electrical diagram and PCB TSC-PP 10



PCB TSC-PP 10
26346-803561911

9. Bill of material for PCB TSC-PP 10

	Designation:	Stock No.:	Page:		File:	
	PCB CONTROL TSC-PP 10	803561911	Date:	4.2.2002	Disk:	
	R1.2-20.6.02 (R5)				OTVP_1 TS	

No.	Pcs	Designation:	Stock No.:	Alt	Note	Rem / Ven
1	1	PCB CONTROL TSC-PP 10	800552007			IMP
3	1	OP. AMP. SMD TL 082 CD (SO-8)	385055082		IC2	
4	1	IC TEMPERATURE SENSOR LM 335 (TO-92)	385088335		IC1	
7	2	TRANSISTOR SMD BC 857 B	385010856		T2	
10	2	CAPACITOR SMD X7R 1206 M 63V 100NF	384605101		C1,C2	YAGEO
14	1	RESISTOR SMD 1206 1% 0,25W 68K1	393012681	1	R5 at MK-45/20 V1.1 (803561727)	VITROHM
14	1	RESISTOR SMD 1206 1% 0,25W 4K75	393011470	2	R5 at NIO-3/200 (803561746)	VITROHM
15	5	RESISTOR SMD 2512 1% 1.0W 0,1R	394010010		R7,R8,R9,R10,R11	VITROHM
17	1	RESISTOR SMD 1206 1% 0,25W 1K	393011100		R1	VITROHM
18	1	RESISTOR SMD 1206 1% 0,25W 3K01	393011300		R3	VITROHM
19	1	RESISTOR SMD 1206 1% 0,25W 4K75	393011470		R4	VITROHM
20	1	RESISTOR SMD 1206 1% 0,25W 10K	393012100		R2	VITROHM
21	1	RESISTOR SMD 1206 1% 0,25W 100K	393013100		R6	VITROHM
27	1	TERMINAL M 4-P	373908340		X2	
28	1	TERMINAL 2-PIN MKDS 3/2-5.08	303351102		X1	

3.8. PCB Remote & Double video input

1. Description	2
2. Electrical diagram for Remote & Double video input (1/2)	4
3. Electrical diagram for Remote & Double video input (2/2)	5
4. PCB Remote & Double video input	6
5. Bill of material for PCB Remote & Double video input	7

1. Description

PCB REMOTE & DOUBLE VIDEO INPUT

El. diagram: 80356 2033

The pcb REMOTE CONTROL + COMMUNICATION includes three standard D-Sub connectors: a 15-pole female connector (Final stage), a 9-pole male connector (Remote) and a 9-pole female connector (RS232).

FINAL STAGE

To this connector is connected the output stage 100, 200W OTVP. On individual pins, the following signals will be present:

X1/1	(<i>Pout Alarm</i>) : When the output stage signal drops by 3dB, a high signal level (>10V) will appear on this contact.
X1/2	(<i>Pref Alarm</i>): Reflected power indication. The output stage is shut down.
X1/3 to X1/9	(<i>Pout, Pref, Th, U1, U2, I1, I2</i>). These contacts are used for the measurement of power, temperatures, voltages and currents of the output stage.
X1/10,13	(<i>Interlock A, Interlock B</i>): Short-circuited connection 'interlock', when the stage is in operation.
X1/11	(<i>ON/OFF</i>): Starting of the stage in automatic mode.
X1/12	(<i>NC</i>): contact not used.
X1/14,15	Ground ($\perp$)

REMOTE

This connector is used for remote control of OTVP.

X2/1	In the case of failure of transmitter operation, the contact is on GND potential ($I_{max} = 10mA$, $U_{max} = 30V$).
X2/2	Transmitter status is displayed (in the case of operation, the contact has GND potential) ($I_{max} = 10mA$, $U_{max} = 30V$).
X2/3	Presence of video signal ($I_{max} = 10mA$, $U_{max} = 30V$).
X2/4	Remote Start-up (if the transmitter is in Remote mode), the contact is connected to the ground (changeover current $I = -0.5A$).

X2/5	Remote Shutdown of RF power (if the transmitter is in Remote mode), the contact is connected to the ground (changeover current $I = -0.5A$).
X2/6,7	Interlock
X2/8	Auxiliary voltage (+12V)
X2/9	Ground ($\perp$)

RS232

This connector is used for series RS232 communication. The following contacts are used:

X3/2 (*RxD*)

X3/3 (*TxD*)

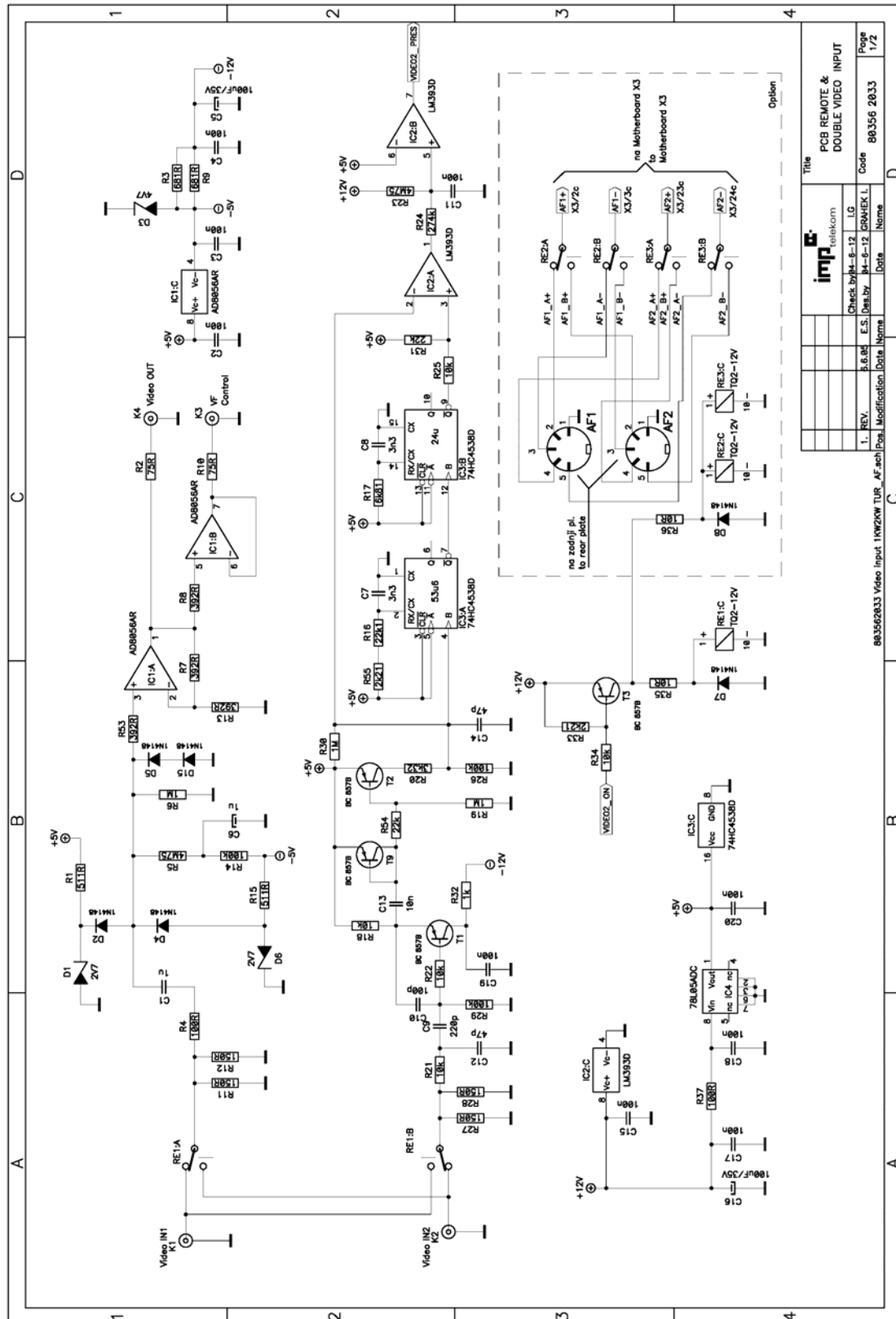
X3/4.... (*DTR*)

X3/5 Ground ($\perp$)

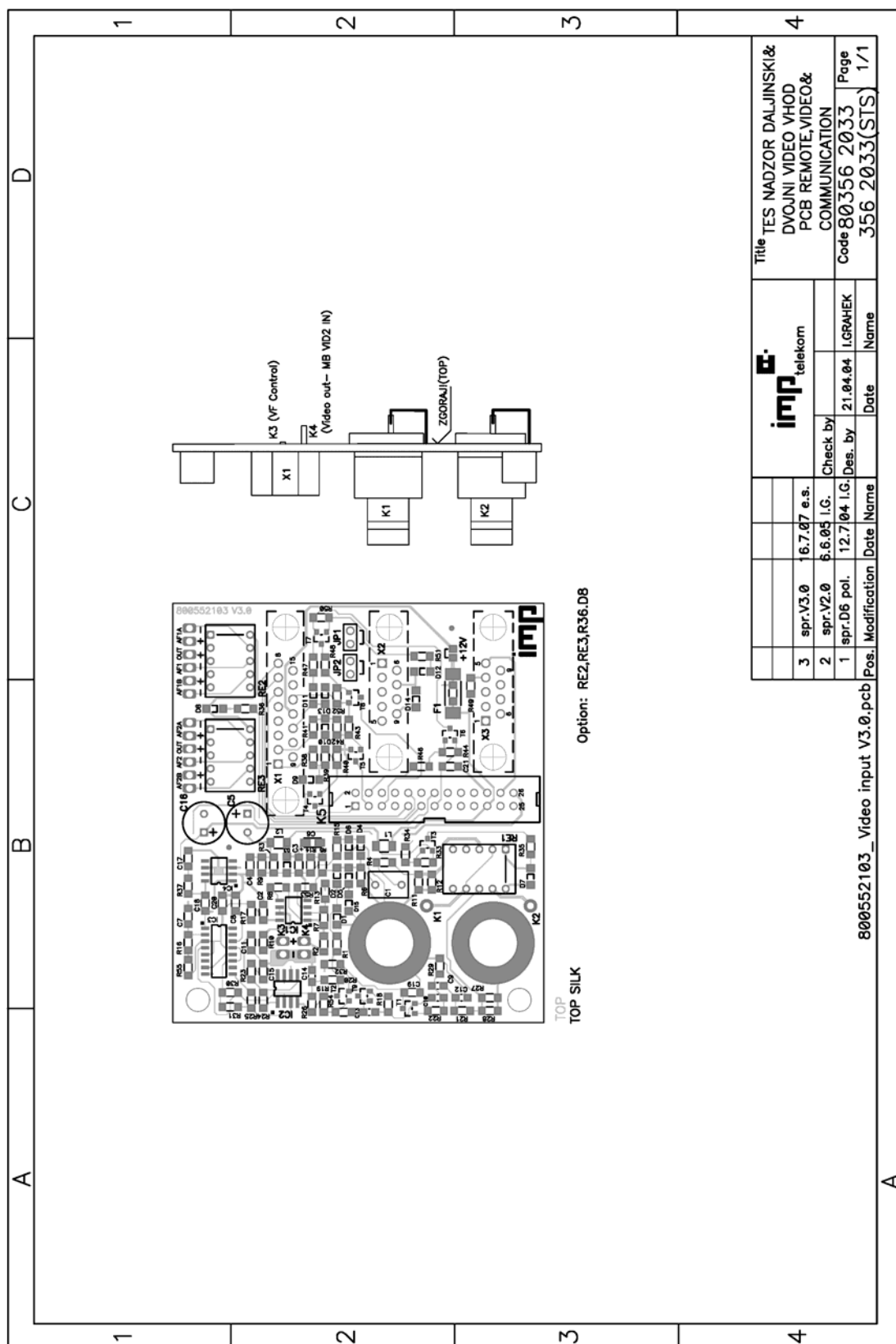
The other contacts are not used.

By means of this connector, OTVP operation can be controlled, and the data concerning its operation can be monitored.

2. Electrical diagram for Remote & Double video input (1/2)



4. PCB Remote & Double video input



5. Bill of material for PCB Remote & Double video input

	Designation:	Stock No.	Page		File:	
	PCB REMOTE & DOUBLE VIDEO INPUT	31128	Date:	7.9.2007	Disk:	
		31587(STS)		803562033		

No.	Pcs	Designation	Stock No.	Signature	Rem./Ven.
2	1	PCB REMOTE, VIDEO, COMUNIC. V3.0	31127-800552103		IMP
4	1	IC AD 8056 AR SO8	6914-385095008	IC1	AD
6	1	IC MVB 74HC4538 SO16	6591-385076538	IC3	PHILIPS
8	1	IC SMD LM 393 D SO8	6505-385055393	IC2	PHILIPS
10	1	VOLT. REGUL. SMD LM 78L05 ACM SO-8	6594-385078003	IC4	NSC
12	3	TRANS SMD (NPN) BC 847B	6476-385046848	T4,T5,T8	PHILIPS
14	6	TRANS SMD (NPN) BC 857 B	6318-385010856	T1,T2,T3,T6,T7,T9	PHILIPS
16	3	DIODE ZENSMD BZV55/C4V 4V7 SOD80	7014-385209047	D3,D9,D10	PHILIPS
18	2	DIODE ZENSMD BZV55/C2V 2V7 SOD80	7013-385209027	D1,D6	PHILIPS
20	10	DIODE SMD LL4148 MELF	7167-385290148	D2,D4,D5,D7,D8,D11, D12,D13,D14,D15	PHILIPS R1
22	2	CAP EL 100UF 35V 8X12 R3.5 M	5670-383400041	C5,C16	ROEDERSTEIN
24	1	CAP PL 1UF 63V 5X7.5 R5 K	5881-383929114	C1	ROEDERSTEIN
26	1	CAP TANSMD 1UF 20V A M	6238-384650002	C6	KEMET
28	10	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C2,C3,C4,C11,C15, C17,C18,C19,C20,C21	YAGEO
30	1	CAP SMD 10NF 50V X7R 0805 M	6212-384604100	C13	YAGEO
32	2	CAP SMD 3,3NF 50V CG 1206 J	6210-384603331	C7,C8	YAGEO
34	1	CAP SMD 220PF 50V CG 0805 K	6192-384602220	C9	YAGEO
36	1	CAP SMD 100PF 50V CG 0805 J	31142-384602099	C10	YAGEO
38	2	CAP SMD 47PF 50V CG 0805 J	31145-384601469	C12,C14	YAGEO
40	2	RESISTOR SMD 4M75 1206 0,25W 1%	8942-393014470	R5,R23	VITROHM
42	3	RESISTOR SMD 1M 1206 0,25W 1%	8784-392026100	R6,R19,R30	VITROHM
44	1	RESISTOR SMD 274K 1206 0,25W 1%	8925-393013270	R24	VITROHM
46	3	RESISTOR SMD 100K 1206 0,25W 1%	8914-393013100	R14,R26,R29	VITROHM
48	8	RESISTOR SMD 22K 1206 0,25W 1%	8899-393012220	R16,R31,R38,R41, R46,R48,R51,R54	VITROHM R
50	7	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R18,R21,R22,R25, R34,R39,R42	VITROHM R
52	1	RESISTOR SMD 6K81 1206 0,25W 1%	8883-393011680	R17	VITROHM
54	2	RESISTOR SMD 2K21 1206 0,25W 1%	8868-393011220	R33,R55	VITROHM
56	6	RESISTOR SMD 3K32 1206 0,25W 1%	8873-393011330	R20,R40,R43,R44, R50,R52	VITROHM R1
57	1	RESISTOR SMD 1K5 1206 0,25W 1%	8861-393011150	R47	VITROHM R1
58	2	RESISTOR SMD 1K 1206 0,25W 1%	8856-393011100	R32,R49	VITROHM
60	2	RESISTOR SMD 681R 1206 0,25W 1%	8852-393010680	R3,R9	VITROHM
62	2	RESISTOR SMD 511R 1206 0,25W 1%	8850-393010510	R1,R15	VITROHM
64	4	RESISTOR SMD 392R 1206 0,25W 1%	8846-393010390	R7,R8,R13,R53	VITROHM

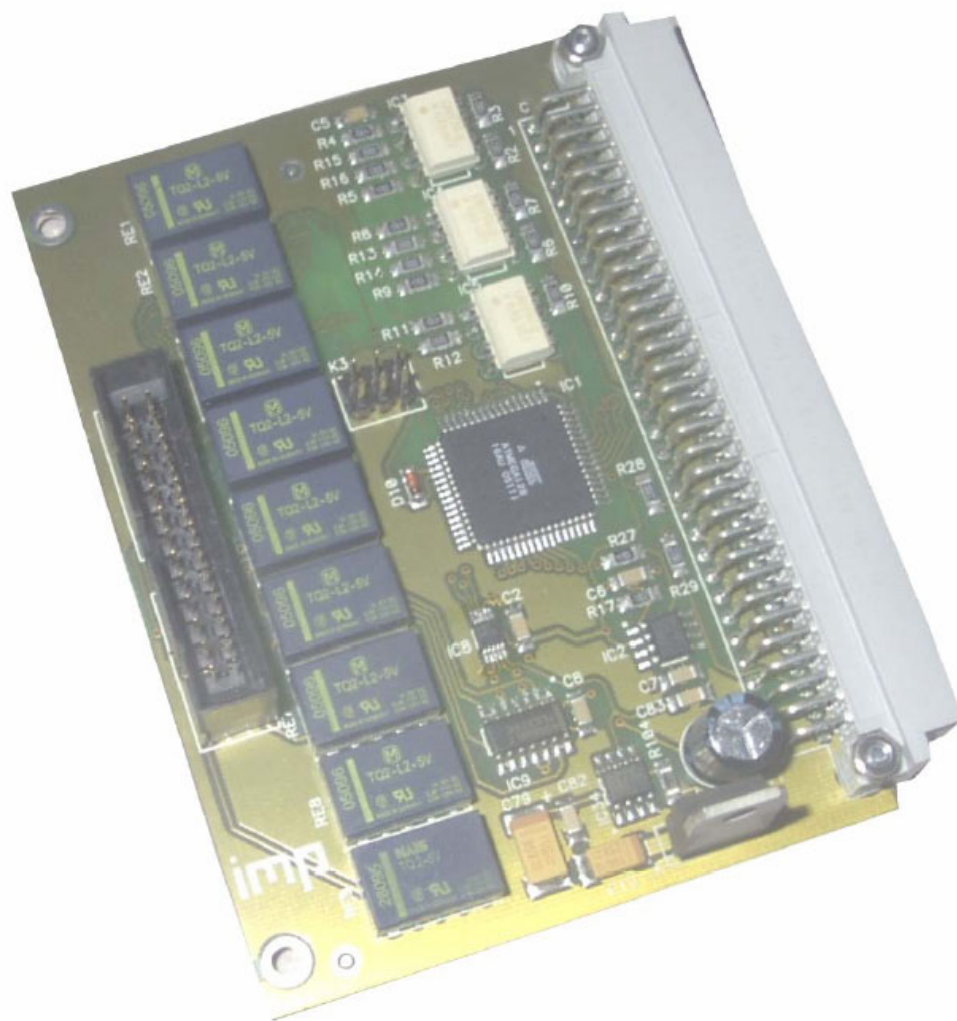
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	PCB REMOTE & DOUBLE VIDEO INPUT	31128	Date:	7.9.2007	Disk:	
		31587(STS)		803562033		

No.	Pcs	Designation	Stock No.	Signature	Rem./Ven.
66	4	RESISTOR SMD 150R 1206 0,25W 1%	8699-392022154	R11,R12,R27,R28	VITROHM
68	2	RESISTOR SMD 100R 1206 0,25W 1%	8833-393010100	R4,R37	VITROHM
70	2	RESISTOR SMD 75R0 1206 0,25W 1%	8830-393010075	R2,R10	VITROHM
72	2	RESISTOR SMD 10R 1206 0,25W 1%	8677-392021100	R35,R36	VITROHM R1
74	1	FUSE SMD 60V 0,3A PFSM.030.2	31208-333006030	F1	SCHURTER
76	2	COIL SIMID02 4.7UH B82422A1472	7570-387800470	L1,L2	SIEMENS
78	3	RELAY TQ2-12V-MAT.12V 1A IC37503012	3956-317810131	RE1,RE2,RE3	NATIONAL R1
80	2	JUMPER CAB4 R=2.54	8082-389210235	JP1,JP2	FISCHER
82	0,2	SQUARE-PIN 1-ROW 36-P M2.54 SL11/112G36	4657-373908151	JP1,JP2	FISCHER
84	1	CONNECTOR D-SUB 9-POL PCB D-9 P-TL	4626-373908011	X2	SNEDIC
86	1	CONNECTOR D-SUB 9-POL PCB D-9 S-TL	4627-373908012	X3	SNEDIC
88	1	CONNECTOR D-SUB PCB 15-P D-15 S-TL	4875-373908625	X1	SNEDIC
90	2	CONNECTOR BNC 22-BNC-75-0-1	4577-373905129	K1,K2	SUHNER
98	1	RF CABLE CONTROL V4	31204-801570986	K3	IMP
100	1	FLAT CABLE 26P(OTVP)	31233-801570988	K5	IMP
102	1	RF CABLE VIDEO-OUT (RG178)	31234-800570416	K4	IMP

3.9 PCB Remote OTVP-Exc

1. General description	3
2. Block diagram	6
3. Bill of material (general)	7
4. Electrical diagram for RFA-402D	8
5. PCB for RF Amplifier RFA-402D OTVP, DVB-T	9
6. Bill of material for PCB RFA-402D UHF OTVP, DVB-T	10

PCB Remote Control



1. Description

Data Retention and Protection

Transmitter setup and event log data are stored in nonvolatile RAM M48T08 from ST. This is timekeeper SRAM memory with expected data retention time of 10 years. It has automatic power-fail chip deselect and write protection. MCU software also stores two copies of setup data for additional protection.

Remote Control

- 1) Remote control through parallel interface (relay-contacts, opto-isolators) according to IEC 864-1.

The following commands are provided:

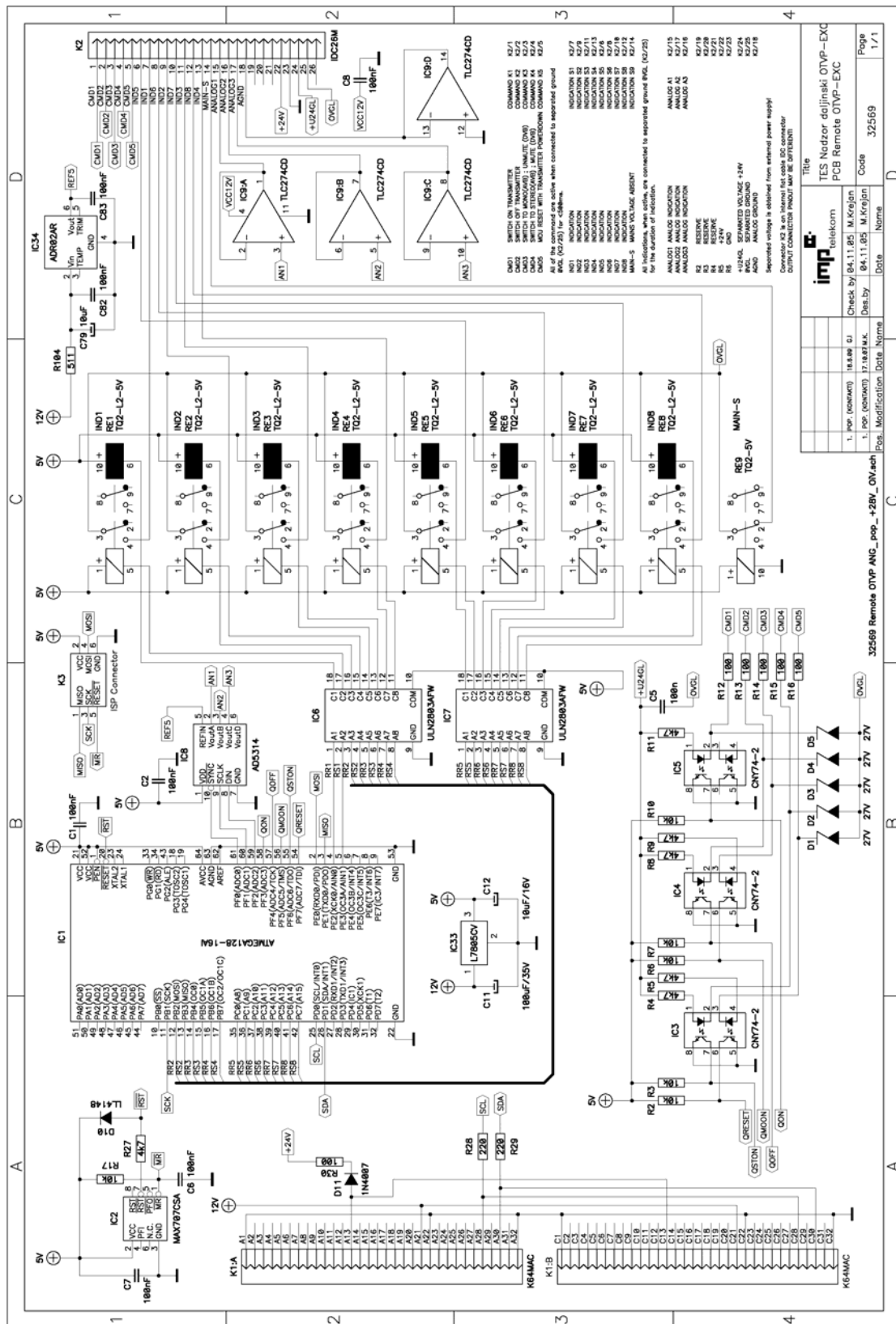
- Transmitter switch ON
- Transmitter switch OFF
- Switch to mono
- Switch to stereo
- Reset of MCU and turn OFF the transmitter
- Vision power low

The following signals are provided:

- Low vision power
- Low sound power
- Low vision+sound power
- Video present
- Stereo ON
- Local mode
- Mains voltage present
- Fault

- 2) Remote control through RS232C interface with Lab VIEW based PC software for monitor and control transmitter. Software provides all of the functionality of the MICROCONTROLLER UNIT. All of the system settings are password protected.

2. Electrical diagram for PCB Remote Control OTVP-EXC



1

4. Flat cable control – MCE OTVP intern

Connector 13X5 (Remote)

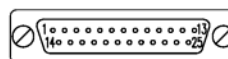
Pin Assignments:

Pin nr. D-Sub	Pin nr. FC Conn.	Direct.	Abrev.	Function:	Remark:
1	1	←	ON	Tx Switch-On	Command
2	3	←	UNMUTE	Manual MUTE Off	Command
3	5	←	RESET	RESET	Command
4	7	→	ON-S	Transmitter ON	Signalisation
5	9	→	MUTE-S	Manual MUTE	Signalisation
6	11	→	GPS-S	GPS Lock	Signalisation
7	13	→	POUT-S	Pout alarm<-3dB	Signalisation
8	15	o		/	Do not use
9	17	o		/	Do not use
10	19	o		/	N.C.
11	21	o		/	N.C.
12	23	←	0V	⊥	Internal
13	25	o	0VGL	⊥ GND g.s.	0V galv.sep.
14	2	←	OFF	Tx Switch-Off	Command
15	4	←	MUTE	Manual MUTE	Command
16	6	→	LOC-S	Local	Signalisation
17	8	→	FAU-S	Fault (Th,Prefl;...)	Signalisation
18	10	→	PREFL-S	Prefl-alarm	Signalisation
19	12	→	ASI-S	ASI Present	Signalisation
20	14	→	MAIN-S	MAINS Fault	Signalisation
21	16	→	POUT-A	Pout	Analog A3
22	18	o	AGND	Analog Ground	AGnd
23	20	o		/	N.C.
24	22	←	+24V	Power Supply +24V	Internal
25	24	←	+24V-GL	Power Supply +24V g.s.	+24V galv.sep.
/	26		/	/	/

Connector Header 26 pins



D-SUB 25 M



							Flat Cable Control - MCE OTVP intern (OTVP - 4/X-D)		
				Check by	18.X.2008	M.K.			
				Des.by	18.X.2008	Z.J.			
Pos.	Modification	Date	Name		Date	Name	32569; 32613-801571014		
								List	1/1

5. Bill of material for PCB Remote Control OTVP-EXC

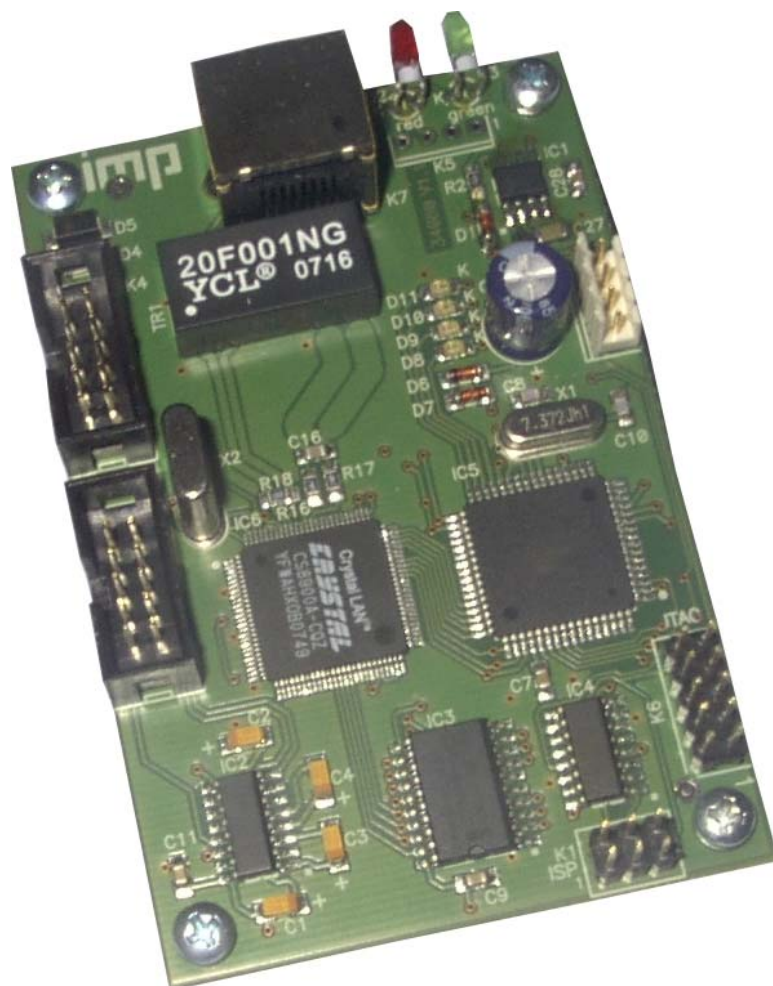
	Designation:	Stock No.	Page:		File:	
	PCB REMOTE OTVP-EXC	32569	Date:	7.11.2005	Disk:	

No.	Pcs.	Designation	Stock No.	Signature	Rem./Ven.
2	1	PCB REMOTE OTVP	32568		IMP
3	1	IC ADR02 AR SO8	6815-385088254	IC34	ANALOG DEVICES
4	1	IC AD 5314 BRM MSOIC-10	6925-385095021	IC8	ANALOG DEVICES
6	1	IC ATMEGA128-16AI TQFP-64	6614-385078428	IC1	ATMEL
8	2	IC ULN 2803 AFW SOL18P	6540-385072803	IC6,IC7	TOSHIBA
10	1	IC TLC 274 CD SO14	30984-385083274	IC9	TI
12	1	IC MAX 707 CSA SO8	6816-385088277	IC2	MAXIM
14	3	OPTOCOPLER CNY 74-2 DIP-8	6876-385090374	IC3,IC4,IC5	SIEMENS
16	1	VOLTAGE REGUL. LM 7805 CT TO-220	6844-385088805	IC33	NSC
18	5	DIODE ZENSMD BZV55/C27 27V SOD80	7025-385209270	D1,D2,D3,D4,D5	PHILIPS
20	1	DIODE SMD LL4148 MELF	7167-385290148	D10	PHILIPS
22	1	RELAY TQ2-5V	3955-317810130	RE9	MATSUSHITA
24	8	RELAY TQ2-L2-5V	3959-317810135	RE1-RE8	MATSUSHITA
26	1	CAP EL 100UF 35V 8X12 R3.5 M	5670-383400041	C11	ROEDERSTEIN
28	8	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C1,C2,C5,C6,C7,C8,C82,C83	YAGEO
29	1	CAP TANSMD 10UF 16V C M	6244-384651009	C12	KEMET
30	1	CAP TANSMD 10UF 35V D M	6246-384651011	C79	KEMET
32	6	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R2,R3,R6,R7,R10,R17	VITROHM
34	6	RESISTOR SMD 4K75 1206 0,25W 1%	8879-393011470	R4,R5,R8,R9,R11,R27	VITROHM
36	5	RESISTOR SMD 100R 1206 0,25W 1%	8833-393010100	R12,R13,R14,R15,R16	VITROHM
38	2	RESISTOR SMD 221R 1206 0,25W 1%	8839-393010220	R28,R29	VITROHM
40	1	RESISTOR SMD 511R 1206 0,25W 1%	8850-393010510	R104	VITROHM
44	0.1	SQUARE-PIN DOUBLE ROW 2X36P M2.54 SL22 112 G	4663-373908157	K3	FISHER
48	1	CONNECTOR ANGLE 64-P (M) STV-C-64-M-AC	4795-373908368	K1	ERNI
50	1	CONNECTOR HEADER 26-POL(M)	4767-373908326	K2	ERNI

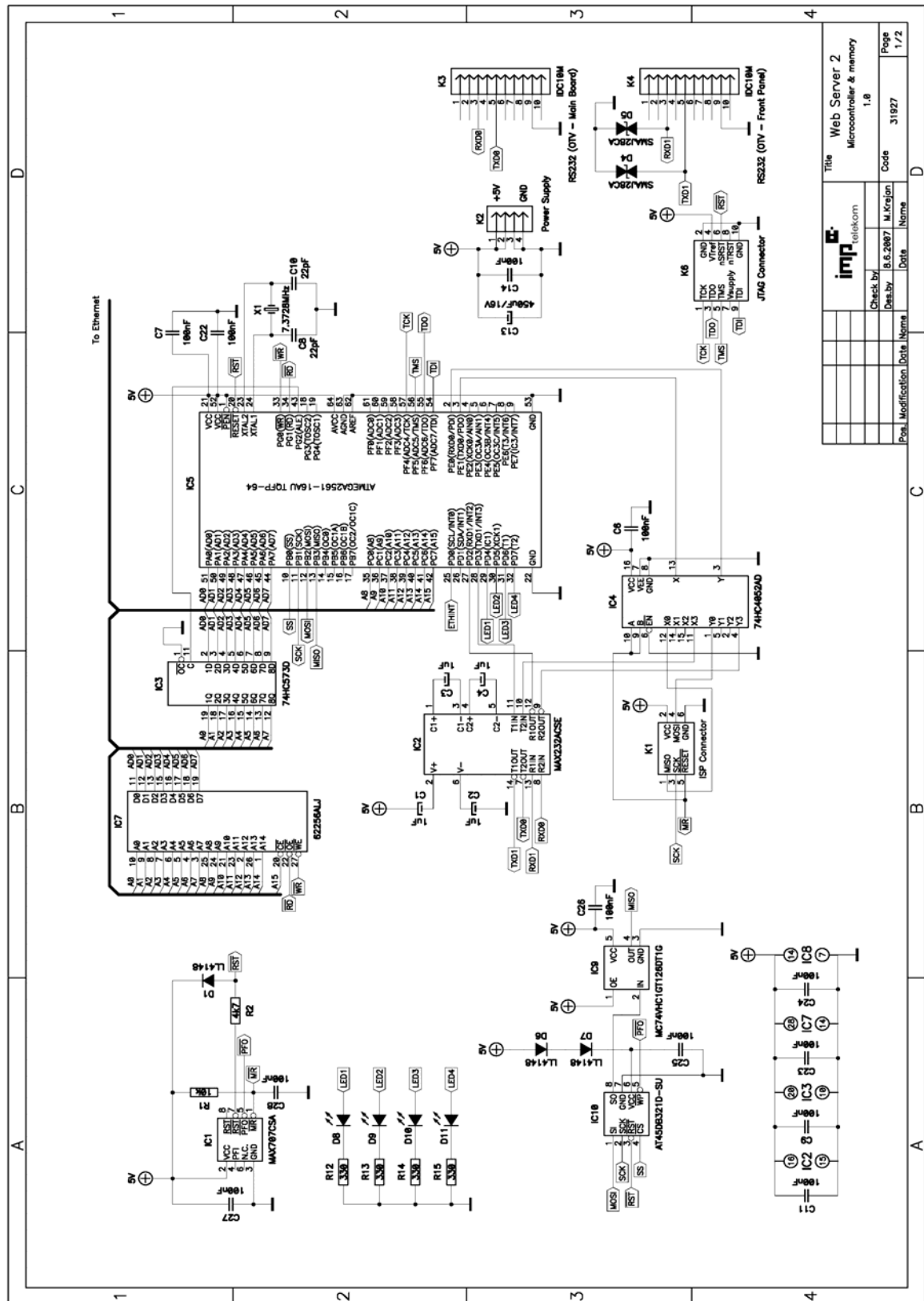
3.10 PCB Web Server 2 V1.1

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2. Electrical diagram Web Server (Ethernet controller)	4
3. PCB Web Server 2	5
4. Bill of material Web Server 2	6
5. Diagram for PCB Modulator jack RJ-45	8
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7. Description	10

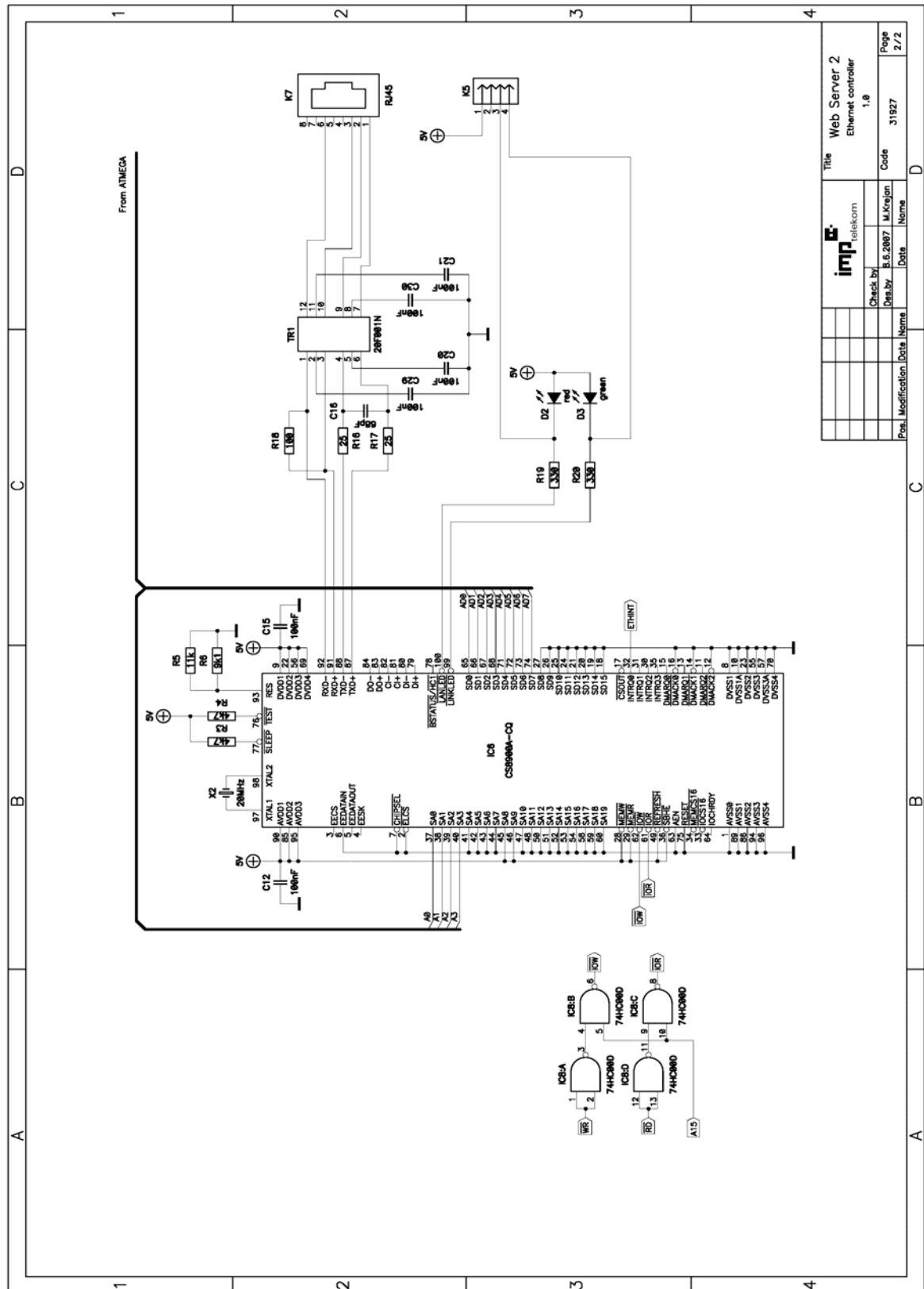
PCB Web Server 2 V1.1

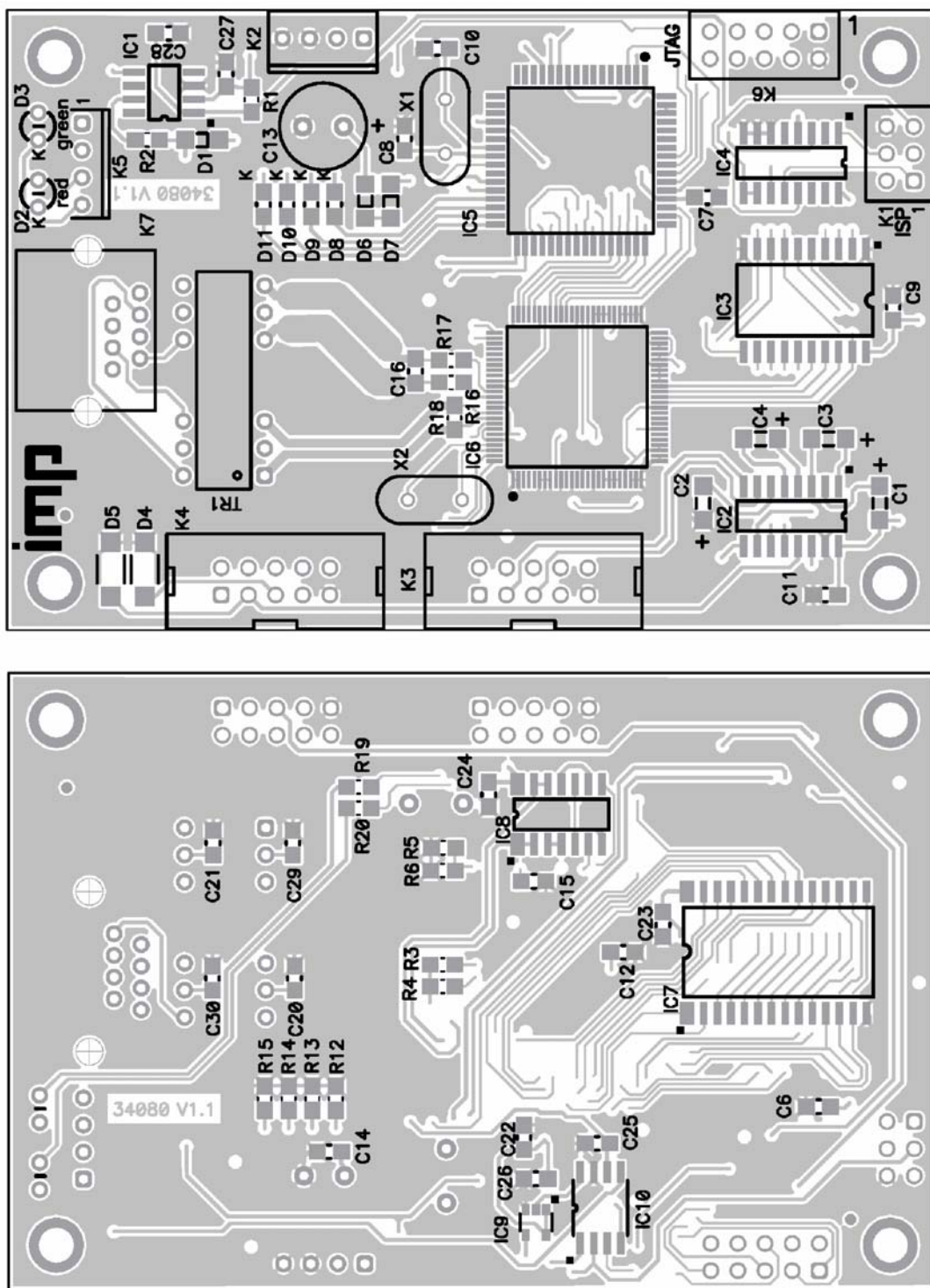


1. Electrical diagram Web Server 2 (Microcontroller & memory)



2. Electrical diagram Web Server 2 (Ethernet controller)





4. Bill of material Web Server 2

Designation:	Stock No.	Page:	File:
PCB WEB SERVER 2 V1.1	31927	Date: 7.3.07	Disk:
	31969(STS)		

No.	Pcs	Designation	Stock no.	Signature	Rem./Ven.
2	1	PCB WEB SERVER 2 V1.1	34080		IMP
4	1	IC ATMEGA2561-16AU TQFP-64	34146-385078430	IC5	ATMEL
5	1	IC SMD 74HC00D SO14	6570-385075600	IC8	PHILIPS
6	1	IC SMD 74HC573D SOT163-1	6588-385075873	IC3	PHILIPS
7	1	IC SRAM 62256 ALJ SOP-28	6535-385072758	IC7	HITACHI
8	1	IC SMD 74HC4052D SO16	6582-385075820	IC4	PHILIPS
10	1	IC SMD MAX 232 ACSE SO16	6818-385088282	IC2	MAXIM
11	1	IC SMD AT45DB321D-SU (EIAJ-SOIC)	34126-385078945	IC10	ATMEL
12	1	IC SMD MC74VHC1GT126DT1G (SOT-353)	34127-385076326	IC9	ON SEMIC.
14	1	IC CS8900-CQ TQFP-100	6798-385087890	IC6	CIRRUS
16	1	IC MAX 707 CSA SO8	6816-385088277	IC1	MAXIM
17	1	ETHERNET TRAFO 20F001N 10BASET-DIP	6790-385086120	TR1	YCL
18	3	DIODE SMD LL4148 MELF	7167-385290148	D1,D6,D7	DIOTEC
19	2	DIODE LED SMD0805 RD KP-2012EC	32606-385255130	D10,D11	KINGBRIGHT
20	2	DIODE LED SMD0805 ZE KP-2012SGC	32605-385255137	D8,D9	KINGBRIGHT
21	1	DIODE LED RD F13MM L-934 HD/B	7113-385255030	D2	KINGBRIGHT
22	1	DIODE LED ZE F13MM L-934 GD/B	7117-385255037	D3	KINGBRIGHT
24	2	DIODE SUPRES SMAJ28CA 28V	7181-385340028	D4,D5	ST
26	1	CAP EL 470UF 10V 8X12 R3.5 T	5681-383400078	C13	FROLYT
28	4	CAP TANSMD 1UF 16V A M	6237-384650001	C1,C2,C3,C4	
30	18	CAP SMD 100NF 50V X7R 0805 M	32942-384605103	C6,C7,C9,C11,C12,C14,C15,C20,C21,C22,C23,C24,C25,C26,C27,C28,C29,C30	YAGEO
32	1	CAP SMD 68PF 50V CG 0805 K	6183-384601680	C16	YAGEO
34	2	CAP SMD 22PF 50V CG 0805 K	6175-384601220	C8,C10	YAGEO
36	1	RESISTOR SMD 11K 0805 0,125W 1%	34129-395012110	R5	VITROHM
38	1	RESISTOR SMD 10K 0805 0,125W 1%	31111-395012100	R1	VITROHM
40	1	RESISTOR SMD 9K1 0805 0,125W 1%	31110-395011910	R6	VITROHM
42	3	RESISTOR SMD 4K75 0805 0,125W 1%	31109-395011475	R2,R3,R4	VITROHM
44	6	RESISTOR SMD 332R 0805 0,125W 1%	32817-395010332	R12,R13,R14,R15,R19,R20	VITROHM

	Designation:	Stock No.	Page:		File:	
	PCB WEB SERVER 2 V1.1	31927	Date:	7.3.07	Disk:	
		31969(STS)				

No.	Pcs	Designation	Stock no.	Signature	Rem./Ven.
46	1	RESISTOR SMD 100R 0805 0,125W 1%	31113-395010100	R18	VITROHM
48	2	RESISTOR SMD 24R9 0805 0,125W 1%	34138-395010025	R16,R17	VITROHM
50	1	QUARTZ CRISTAL HC-49/U MINI 7.3728MHZ	7447-386084107	X1	JAUCH
52	1	QUARTZ CRISTAL HC-49/U MINI 20.0MHZ	7448-386084120	X2	JAUCH
54	2	CONNECTOR 4P M PCB TYCO 829154-4	4774-373908342	K2,K5	AMP-TYCO
56	2	CONNECTOR HEADER 10-POL(M) 281271-1	4745-373908264	K3,K4	AMP-TYCO
58	1	MICROINLET PCB 2DC088 LE TEHNIKA	5001-373918068	K7	LE TEHNIKA
60	0,22	SQUARE PIN 2-VR 2X36P M2.54 SL22 112 G	4663-373908157	K1,K6	FISCHER

Ethernet Cable Configuration (RJ-45)

Diagram illustrating the wiring configuration for an Ethernet cable (RJ-45) using the T568A standard. The diagram shows the internal wiring of the cable, the RJ-45 connector, and the corresponding pinout table.

Wiring Standards:

- TX+ (1):** White/Blue
- TX- (2):** Blue
- RX+ (3):** White/Green
- RX- (4):** Green
- TX+ (5):** White/Orange
- RX- (6):** Orange
- TX- (7):** White/Brown
- RX+ (8):** Brown

Pinout Table:

Pin	Function	Wire Color
1	Transmit (+)	White-Orange
2	Transmit (-)	Orange
3	Receive (+)	White-Green
4	--	Blue
5	--	White-Blue
6	Receive (-)	Green
7	--	White-Brown
8	--	Brown

Connector Details:

- RJ-45:** The standard connector used for Ethernet networking.
- WEB Server:** The device connected to the Ethernet network.
- TOP SILK:** The top layer of the cable jacket.

Designation:	Stock No:	Date:	5.10.2011
<i>PCB MODULAR JACK RJ-45 8-POL</i>	31271		

9

7. Description

WEB SNMP V1.0

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1.WEB/SNMP Config description

WEB/SNMP CONFIG software is used to configure WEB/SNMP module built in IMP-TELEKOM transmitters and transposers or external WEB-MODEM module applied with low power transposers.

2.User manual

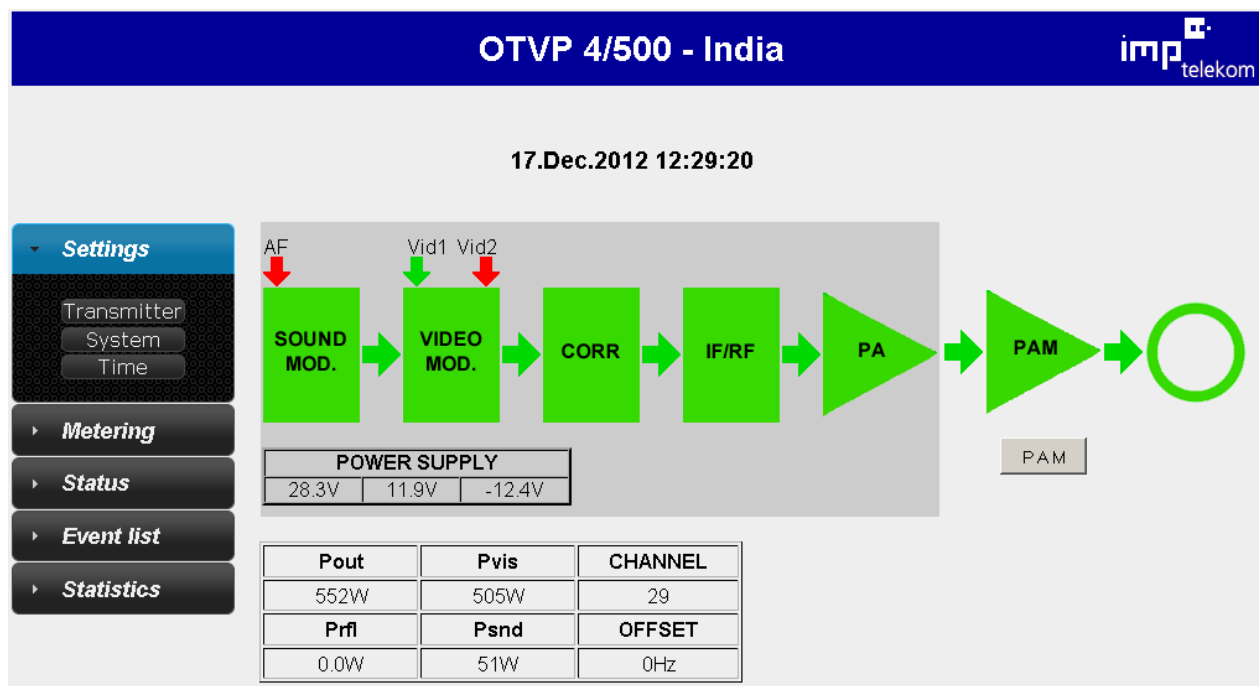
2.1Installation

Run setup.exe from applied CD and install program.

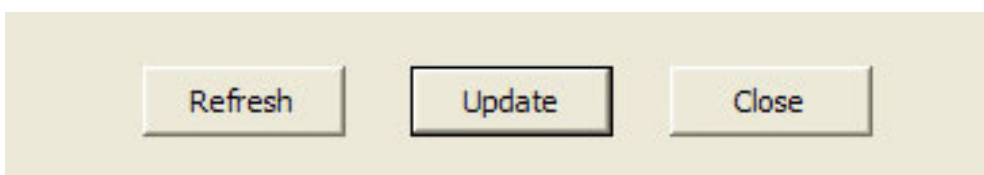
Run WEB-SNMP Config from All Programs menu.

2.2Software description

Software window is divided in 4 sections. First section covers Web server settings, second section SNMP agent, third section communication settings and last module info. In order to change certain setting click desired field and cursor will appear.



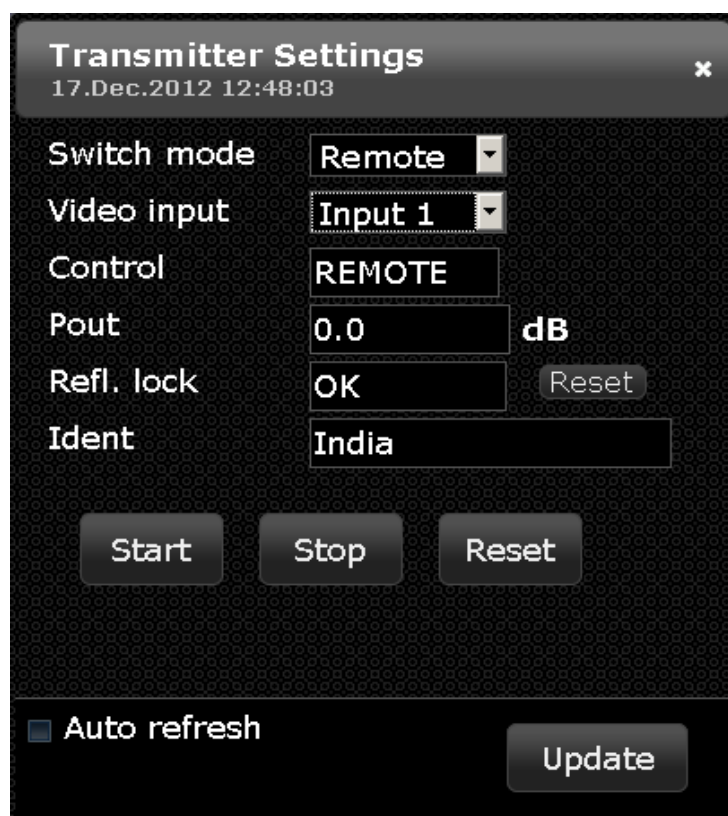
Click “Refresh” button to read or “Update” button to load settings to WEB/SNMP unit. By clicking “Close” you will exit from program.



2.3 Web server

This is configuration for web-server option. IP address, filtering, username and password for web access can be set here. There are four settings with format xxx.yyy.www.zzz where xxx, yyy, www and zzz are numbers in the range from 0 to 255.

2.4 Settings

A screenshot of a 'Transmitter Settings' dialog box. The title bar shows 'Transmitter Settings' and a close button. Below the title bar, the date and time '17.Dec.2012 12:48:03' are displayed. The settings are as follows: 'Switch mode' is set to 'Remote' (dropdown); 'Video input' is set to 'Input 1' (dropdown); 'Control' is set to 'REMOTE' (text field); 'Pout' is set to '0.0' (text field) with 'dB' to its right; 'Refl. lock' is set to 'OK' (text field) with a 'Reset' button to its right; 'Ident' is set to 'India' (text field). At the bottom, there are three buttons: 'Start', 'Stop', and 'Reset'. Below these buttons is a checkbox labeled 'Auto refresh' which is currently unchecked, and an 'Update' button to its right.

IP Address

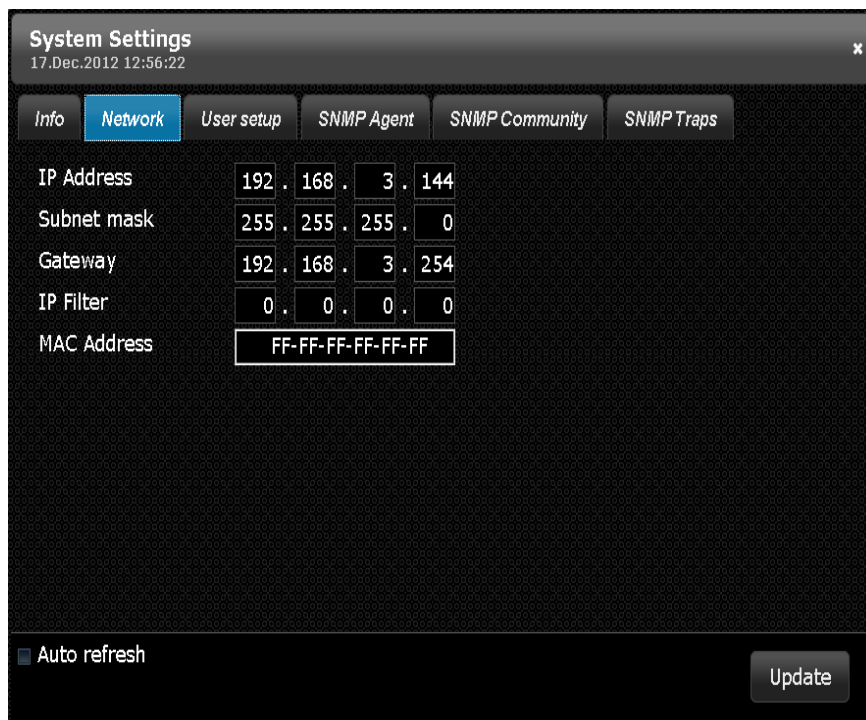
This is IP address of the web server. This number can be typed in the web browser to access site with the transmitter parameters.



System Settings	
17.Dec.2012 12:55:21	
Info Network User setup SNMP Agent SNMP Community SNMP Traps	
Info	OTVP-4/500 V1.8 (C) 2005-2012
Main Controller	V1.8
WEB/SNMP	V2.0
☐ Auto refresh Update	

Subnet Mask

This is subnet mask and with combination of IP address identifies which network segment is transmitter on. Typically default subnet mask use either 0 or 255 as values (such as 255.255.255.0), but other number values can appear.



System Settings	
17.Dec.2012 12:56:22	
Info Network User setup SNMP Agent SNMP Community SNMP Traps	
IP Address	192 . 168 . 3 . 144
Subnet mask	255 . 255 . 255 . 0
Gateway	192 . 168 . 3 . 254
IP Filter	0 . 0 . 0 . 0
MAC Address	FF-FF-FF-FF-FF-FF
☐ Auto refresh Update	

Gateway

This is address of gateway. It is a router that connects two separate network segments (for example local network and internet).

IP Filter

If this number is 0.0.0.0 any client (computer) can access transmitter web page otherwise only computer with same IP as this number can access web page. This setting is also valid for SNMP agent.

Username

When the transmitter web-page is accessed, username and password is required. This is username for accessing page.

Password

This is password for accessing the transmitter web-page.



	Username	Password	Level
1.	IMP	1234	Supervisor
2.			Disabled
3.			Disabled
4.			Disabled
5.			Disabled
6.			Disabled

☐ Auto refresh Update

System Settings
17.Dec.2012 12:57:40

Info
Network
User setup
SNMP Agent
SNMP Community
SNMP Traps

GET/SET port

☐ Auto refresh

System Settings
17.Dec.2012 12:57:49

Info
Network
User setup
SNMP Agent
SNMP Community
SNMP Traps

	Community	Access	Enable
1.	public	Read only	☒
2.	private	Read/Write	☒
3.		Read only	☐
4.		Read only	☐
5.		Read only	☐

☐ Auto refresh

System Settings
17.Dec.2012 12:58:29

Info Network User setup **SNMP Agent** SNMP Community **SNMP Traps**

	IP Address	Trap port	Community	Enable
1.	0 . 0 . 0 . 0	162	private	☐
2.	0 . 0 . 0 . 0	162	private	☐
3.	0 . 0 . 0 . 0	162	private	☐
4.	0 . 0 . 0 . 0	162	private	☐
5.	0 . 0 . 0 . 0	162	private	☐

☐ Auto refresh Update

Time Settings
17.Dec.2012 12:59:10

Time 12:59:10

Date 17.Dec.2012

Synchronization None

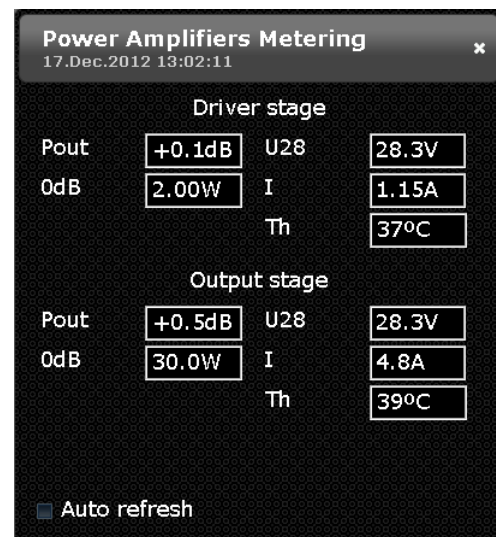
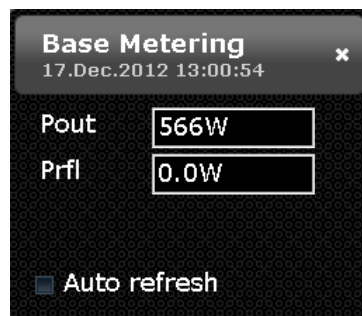
Sync Time 120 min

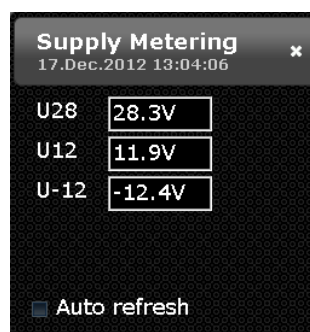
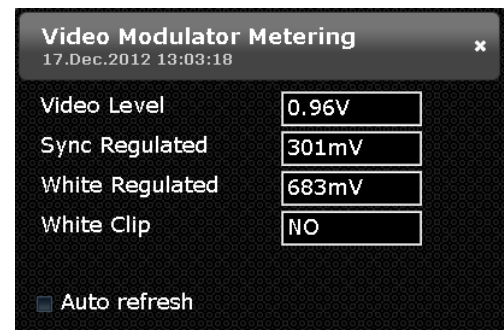
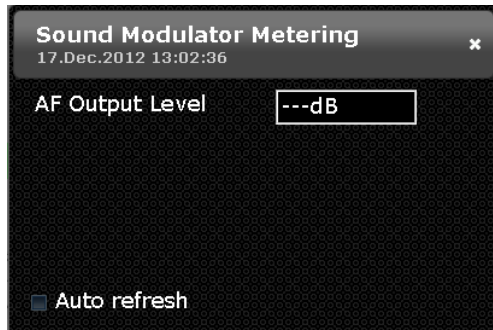
Time Zone UTC 1 : 0

NTP Server IP 192 . 168 . 0 . 100

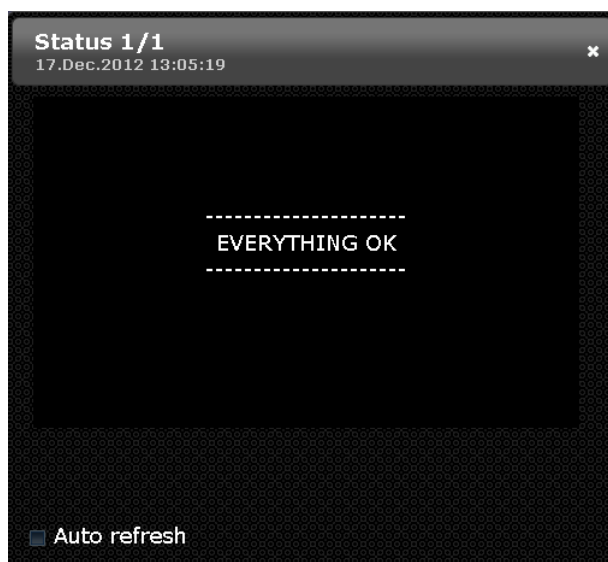
☐ Auto refresh Update

2.5 Metering





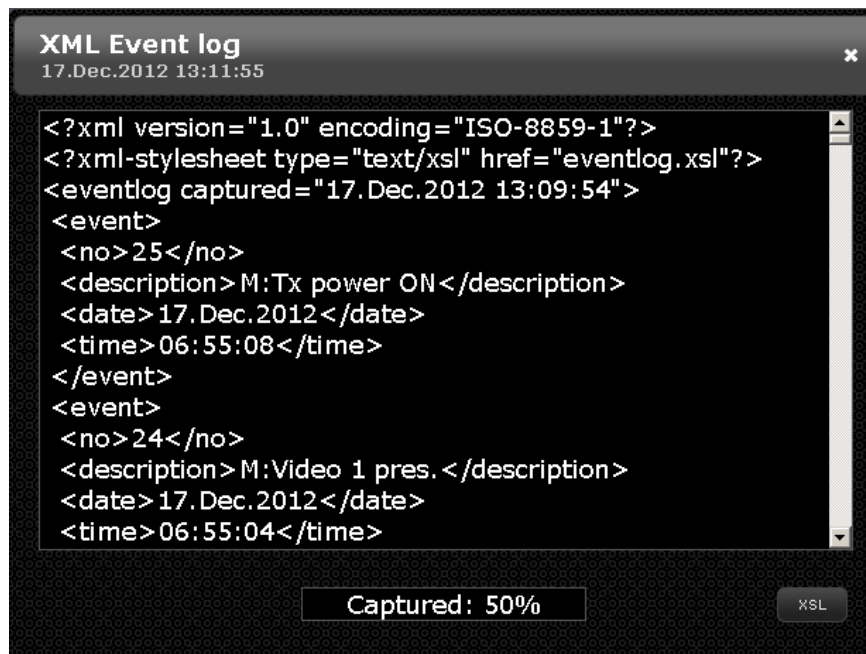
2.6 Status




The screenshot shows a window titled "Event log 1/20" with a timestamp of "17.Dec.2012 13:08:48". It contains a table with the following data:

No.	Description	Date	Time
25.	M:Tx power ON	17.Dec.2012	06:55:08
24.	M:Video 1 pres.	17.Dec.2012	06:55:04
23.	M:Mains restored	17.Dec.2012	06:54:56
22.	M:Mains inter.	14.Dec.2012	14:40:16
21.	M:Tx power OFF	14.Dec.2012	14:24:54
20.	M:Pout restored	14.Dec.2012	14:24:46
19.	F:Pout low	14.Dec.2012	14:24:26
18.	M:Pout restored	14.Dec.2012	14:24:16
17.	F:Pout low	14.Dec.2012	14:23:48
16.	M:Pout restored	14.Dec.2012	14:23:34

Below the table, there is a button with a right-pointing arrow. At the bottom, there is a checkbox labeled "Auto refresh" which is currently unchecked.



2.7 SNMP Agent V1

This is configuration for SNMP Agent V1. Read and write community and Trap addresses can be set here. There are four settings with format xxx.yyy.www.zzz where xxx, yyy, www and zzz are numbers in the range from 0 to 255.

Default setting for read community is public, write community is set to private.

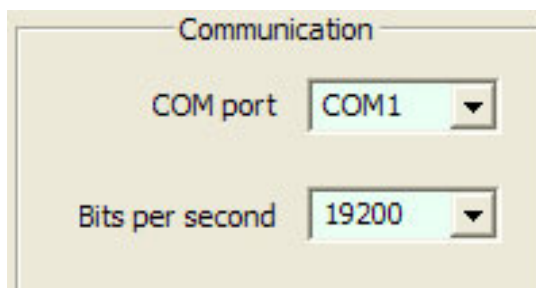
WEB/SNMP unit is able to send traps to four different IP addresses, which can be written to Trap 1, 2, 3 and 4 fields.

SNMP Agent

Read community	public
Write community	private
Trap 1	0 . 0 . 0 . 0
Trap 2	0 . 0 . 0 . 0
Trap 3	0 . 0 . 0 . 0
Trap 4	0 . 0 . 0 . 0

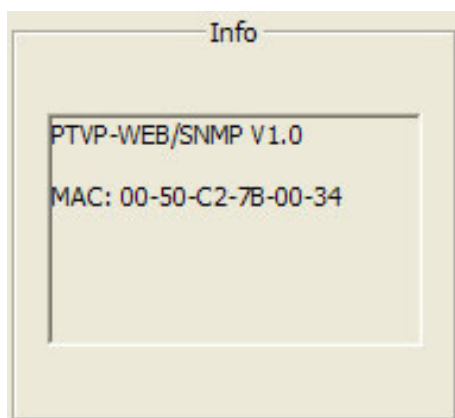
2.8 Communication

COM port window displays all available COM ports. Select correct COM port in order to establish communication. Default »Bits per second« value is 19200.



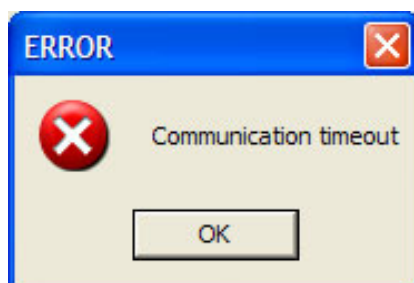
2.9 Info

MAC address and firmware version of WEB/SNMP module is displayed in this window.

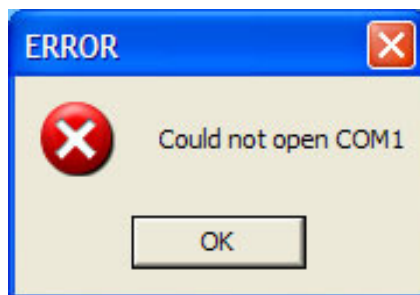


3. Troubleshooting

If “communication timeout” window is shown, check RS 232 connection with microcontroller unit or select other COM port.



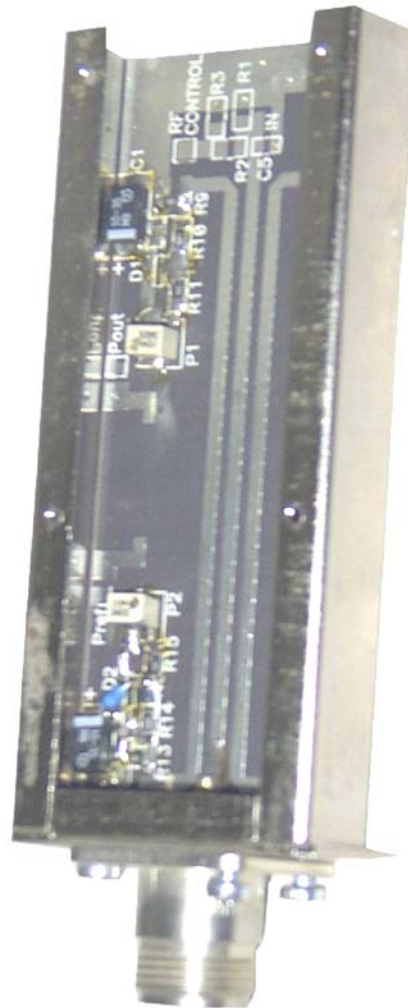
If “Could not open COMx” window is shown, check if there is some other program occupying this COM port.



3.11 Directional Coupler SMS OTVP-100

1. Description	3
2. Electrical diagram, PCB of SMS OTVP-100, Bill of material	4

Directional Coupler SMS



1. Description

DIRECTIONAL COUPLER SMS

Description:

This family of directional couplers includes all types of directional couplers for VHF and UHF ranges and frequency range 2W to 100W. They use strip-line technique and are designed for 50Ω impedance system. The transmission line and both pick-up loops are parallel, and in the same plane. All of the three lines are galvanically isolated.

One pick-up loop provides a signal for ALC; and the other provides a d.c. signal for measuring output power by an appropriate instrument. An RF signal deriving directly from the transmission line is provided, via a damping circuit (R5, R6, R7), for the test point.

Except for the section between the transmission line and the two pick-up loops (spacing), the pcb is identical for all coupler types. Also specific for each type is attenuation by resistor circuits R9, R10, R11 and R13, R14, R15.

Whenever a separate ALC output is not required, the RF signal for the test point is obtained directly from the ALC output (Control).

Tuning:

Indication of output power on the instrument is set by the potentiometer P1. The unit has been calibrated and tested by the manufacturer. No additional calibration is required.

Troubleshooting:

The only item which could be affected is the diode D1. If in spite of the presence of output power, there is no signal for measuring the output power, first check the diode.

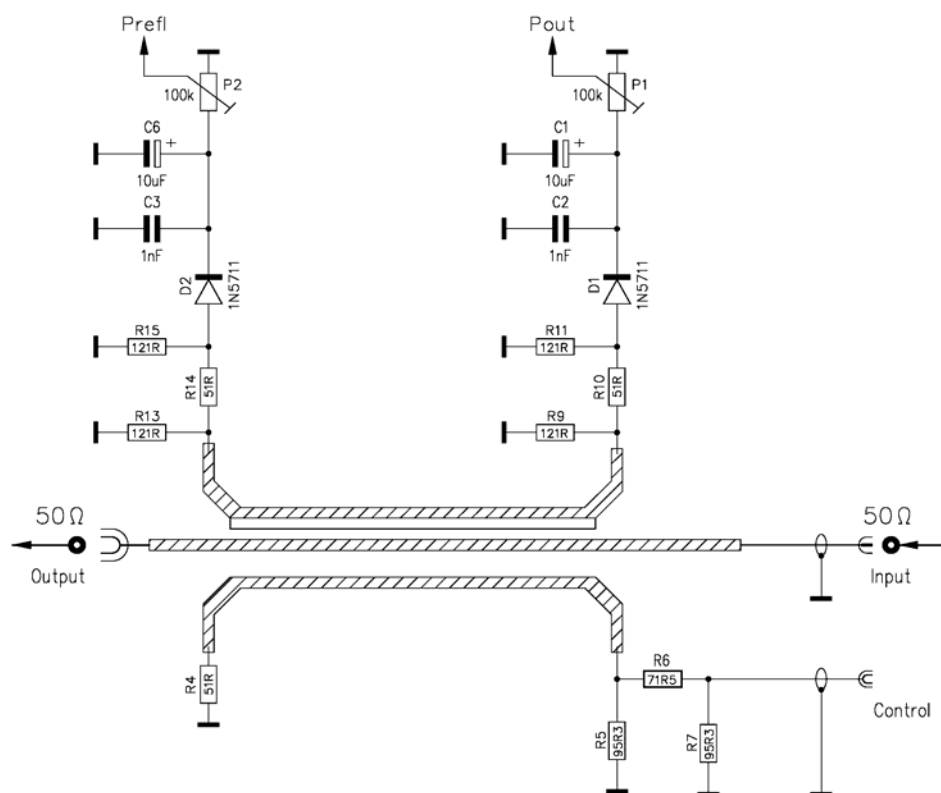
Maintenance:

No maintenance is required.

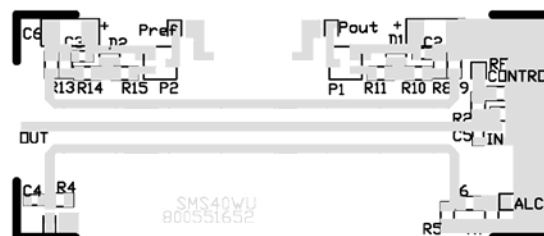
Technical characteristics:

Frequency range	175-230 MHz (type SMS-3/**) 470-860 MHz (type SMS-4/**)
Input and output impedance (ALC):	50 Ω
Input and output matching (ALC):	< - 20 dB
Bandpass attenuation:	< 0,2dB
Input power:	2W - 100W (depending on type)
Voltage level of ALC output And CONTROL output:	approx. 1 V _{RF}
Pout voltage level:	0 - 3 Vdc (all types)

2. Electrical diagram, PCB of SMS OTVP-100, Bill of material



Pos.	Ref.	Designation	Stock Nr.
6	D1,D2	Diode 1N5711	385 225 101
8	C1,C6	Tantal SMD D 10uF 25V M	384 651 010
10	C2,C3	Cap SMD 0805 CG 1nF 50V K	384 603 100
14	R4	Res SMD 1206 51R 1%	392 021 511
15	P1,P2	Trimpot SMD 100k 3224W-1-104	388 514 210
11	R10,R14	Res SMD 1206 1%	VALUES are presettet in factory!
12	R9,R11,R13,R15	"	
13	R6	"	
14	R5,R7	"	

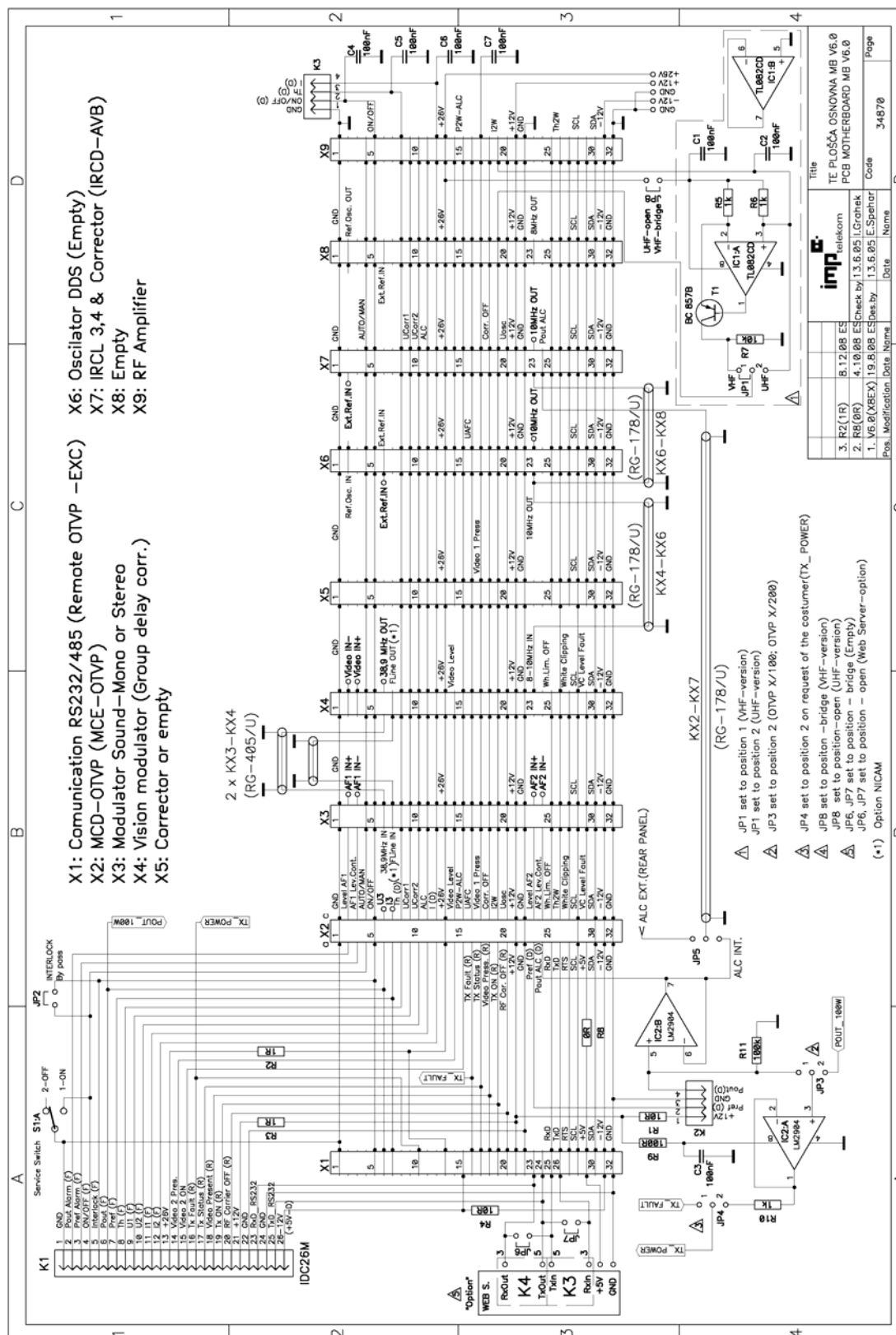


						Directional Coupler SMS-OTVP/PTVP 100	
				Check by	01.VI.2006	I.G.	
				Des.by	01.VI.2006	Z.J.	
Pos.	Modification	Date	Name	Date	Name	33076-8026102002	List 1/1

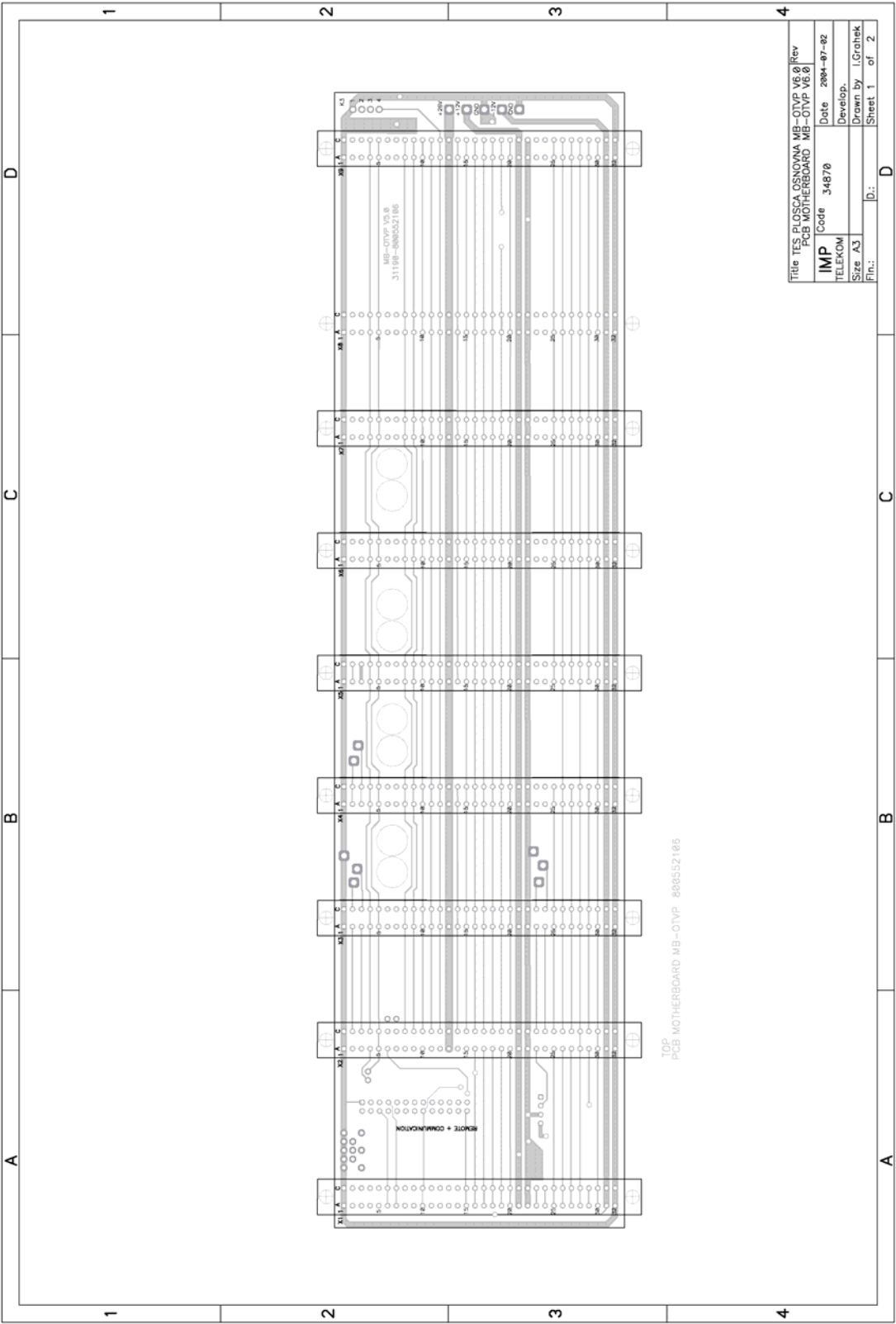
3.12 PCB Motherboard MB-OTVP V6.0

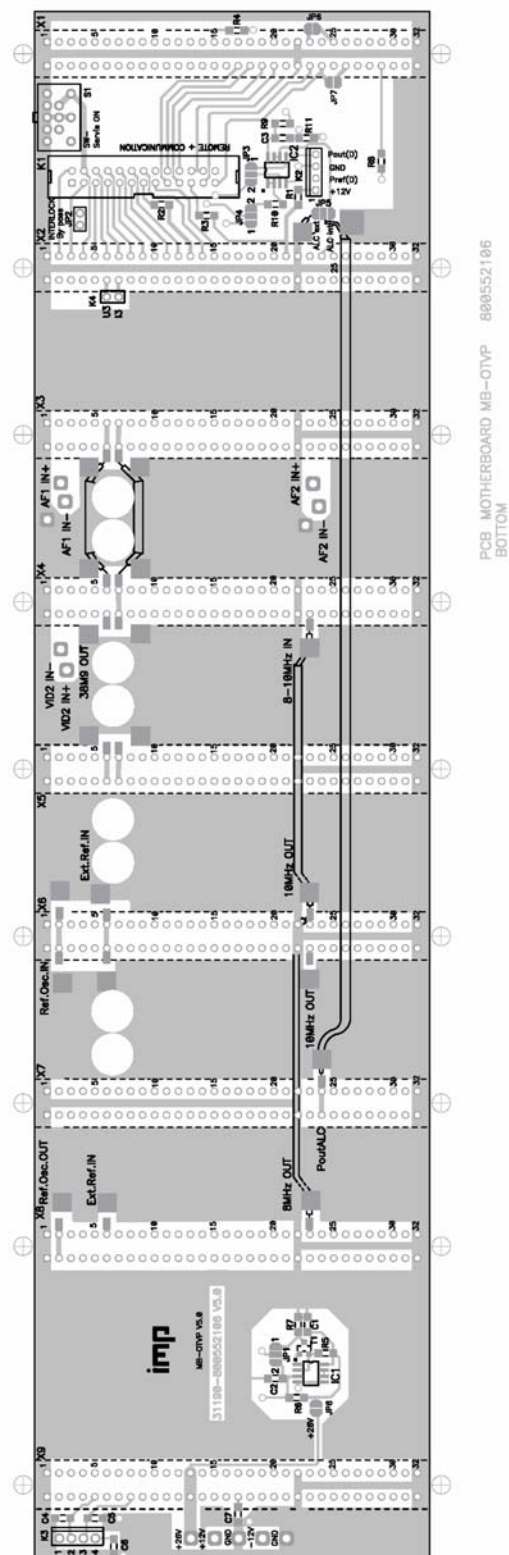
1. Electrical diagram of PCB Motherboard	2
2. PCB for Motherboard	3
3. Bill of material for PCB Motherboard	5

1. Electrical diagram of PCB Motherboard



2. PCB for Motherboard





TES PLOSCA OSNOVNA MB-OTVP V6.0
PCB MOTHERBOARD MB-OTVP V6.0
34870 2/2

3. Bill of material for PCB Motherboard

	Designation:	Stock No.	Page:		File:	
	PCB MOTHERBOARD MB-OTVP V6.0	34870	Date:	12.10.08	Disk:	

No.	Pcs	Designation	Stock No.	Signature	Rem/Ven
2	1	PCB MOTHERBOARD MB-OTVP V5.0	31190-800552106		IMP
6	8	CONNECTOR 64-POL F STV-C-64-F-AC	4796-373908369	X1-X7,X9	ERNI
8	1	SWITCH C42315 A60 A25 S	3694-310901101	S1	SIEMENS
10	1	CONNECTOR HEADER 26-POL (M) 281275-1	4736-373908255	K1	AMP
12	2	CONNECTOR 4P M PCB TYCO 829154-4	4774-373908342	K2,K3	AMP
14	1	SHORT CIRCUIT JUMPER CAB4 R=2.54	8082-389210235	JP2	FISCHER
16	0,06	SQUARE-PIN 1-POW 36-P M2.54 SL11/112G36	4657-373908151	JP2	FISCHER
18	1	OP.AMP. QUAD. SMD LM 2904 M SO-8	6850-385088904	IC2	
20	1	IC SMD TL 082 CD SO8	6499-385055082	IC1	TI
22	1	TRANS SMD (PNP) BC 857 B	6318-385010856	T1	PHILIPS
24	7	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C1,C2,C3,C4,C5,C6,C7	YAGEO
25	1	RESISTOR SMD 0R 1206 0,25W 1%	8801-393009001	R8	VITROHM
26	2	RESISTOR SMD 10R 1206 0,25W 1%	8677-392021100	R1,R4	VITROHM
27	2	RESISTOR SMD 1R 1206 0,25W 1%	8669-392020100	R2,R3	VITROHM
28	3	RESISTOR SMD 1K 1206 0,25W 1%	8856-393011100	R5,R6,R10	VITROHM
30	1	RESISTOR SMD 100R 1206 0,25W 1%	8833-393010100	R9	VITROHM
32	1	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R7	VITROHM
33	1	RESISTOR SMD 100K 1206 0,25W 1%	8914-393013100	R11	VITROHM
38	1	CABLE KX2-KX7 (MCU-IRCL) (L=195MM,RG178) (MB-OTVP)	18818-800570404	JP5-C7/24	IMP
40	2	CABLE KX3-KX4-KX5 (L=32MM,RG405)(MB-OTVP)	18819-800570405	X3/6-X4/6;X3/7-X4/7	IMP
42	2	CABLE KX4-KX6 V4 (REF. OSC) (RG178) (MB-OTVP)	31206-800570414	X4/23-X6/23;X6/23-X7/23	IMP
44	1	CABLE CONTROL A-420	23703-801570909		IMP

3.13 Power Supply PS OTVP-100

1. Description	3
2. Electrical diagram for Power Supply PS OTVP-100	4
3. Power Supply PS OTVP-100 (Setting parts)	5
4. Bill of material for PS OTVP-100 (general)	6
5. Electrical diagram for switching mode pow. supply NS-12 V2.0	7
6. PCB for switching mode pow. supp. NS-12 V2.0	8
7. Bill of material for PCB NS-12	9
8. Technical data for ADA600F	10
9. Technical data for LAMBDA	13

Power supply OTVP



POWER SUPPLY Type OTVP-100

Diagram: 32404

1. Description:

Power supply OTVP-100 is consisted of two modules. First module AC/DC converter converts line voltage 230V to 28 V DC. Second module is DC/DC converter that converts 28 V DC to DC voltages +12V and -12V.

Line voltage 230V AC is connected to input connector X1. Line voltage is applied to AC/DC converter over line fuse and ON/OFF switch. In AC/DC converter is integrated EMI filter. DC/DC converter is by connectors X2 and X3 connected to the output voltage of AC/DC converter. At the output connector X1 of the DC/DC converter following voltages are available:

+32V – X1/6,10,14

+12V – X1/18

-12V – X1/28

GND – X1/4,8,12,16,20,22,24,26

DC/DC converter has additional output connector X4 (+24V) to supply internal fan.

Adjusting:

Output voltage of the AC/DC converter is possible to set from 28V to 32V by potentiometer Vadj. Other output voltages have fixed values.

Hints for eliminate failures.

- if switch S1 in ON position is not illuminated check supply voltage and input fuse 1V1
- If output voltages +12V, -12V are not present check first output voltage from AC/DC converter.

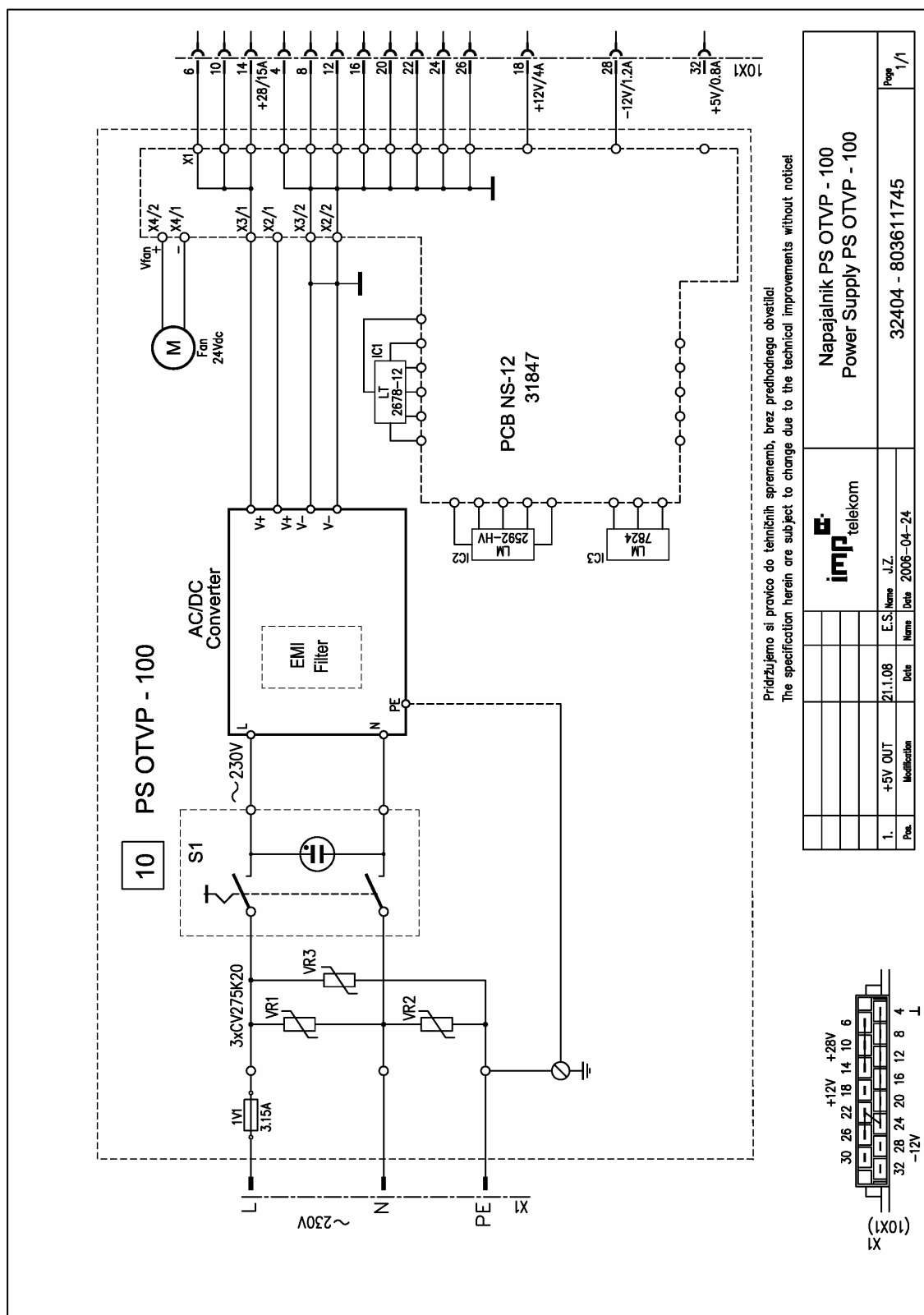
Maintenance:

Not needed.

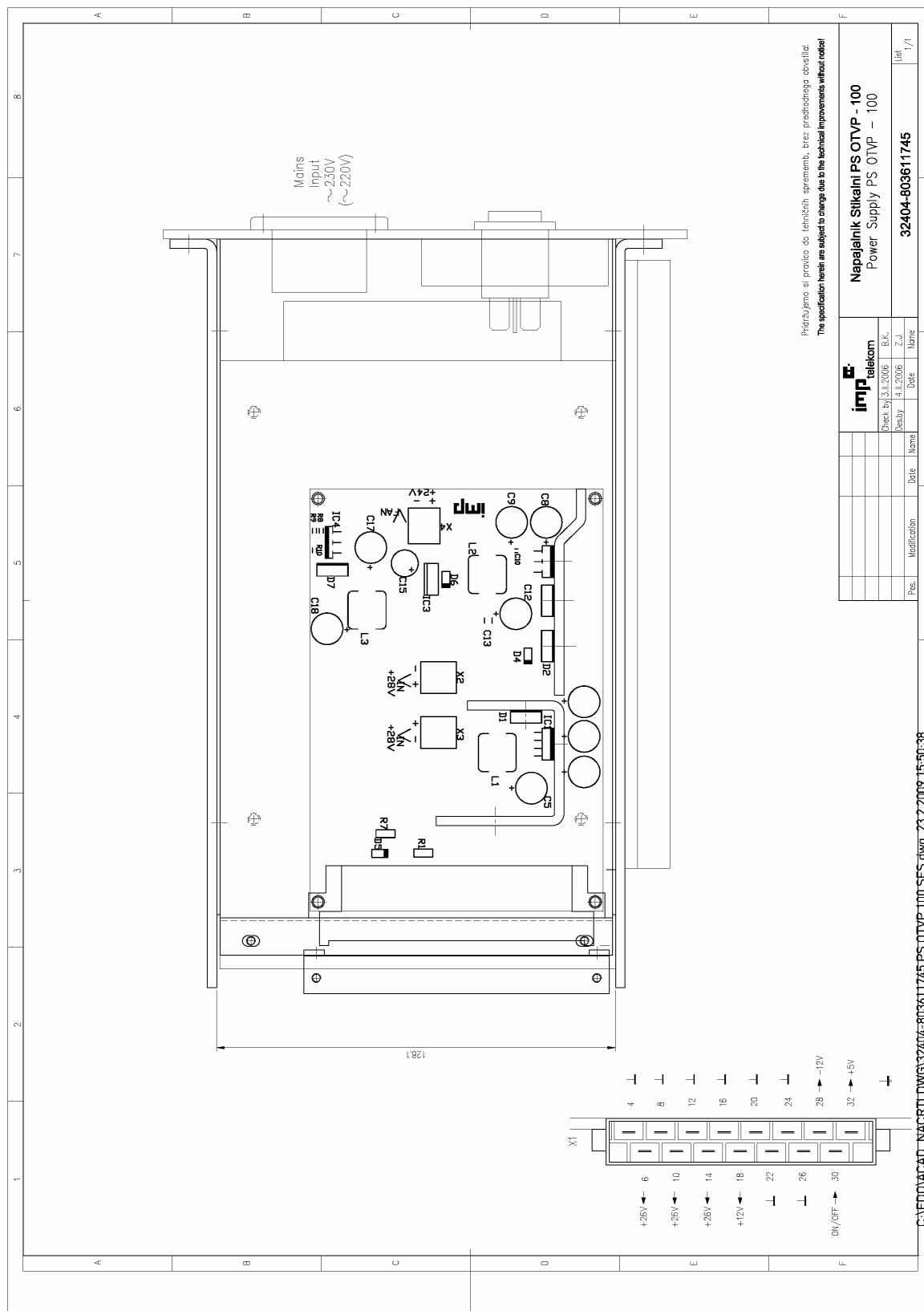
TECHNICAL DATA:

Supply Voltage:	85-264VAC, 50/60Hz,
Input Current:	max. 2.8A (230V _{AC})
Output Voltage 1:	+ 28-32V _{DC} (Ripple+Noise = 220 mV _{pp})
Output Current 1:	max. 15A
Output Voltage 2:	+ 12V _{DC} (Ripple+Noise = 400 mV _{pp})
Output Current 2:	max. 4A
Output Voltage 3:	- 12V _{DC} (Ripple+Noise = 300 mV _{pp})
Output Current 3:	max. 1.2A
Efficiency:	85%

2. Electrical diagram for Power Supply PS OTVP-100



5



4. Bill of material for PS OTVP-100 (general)

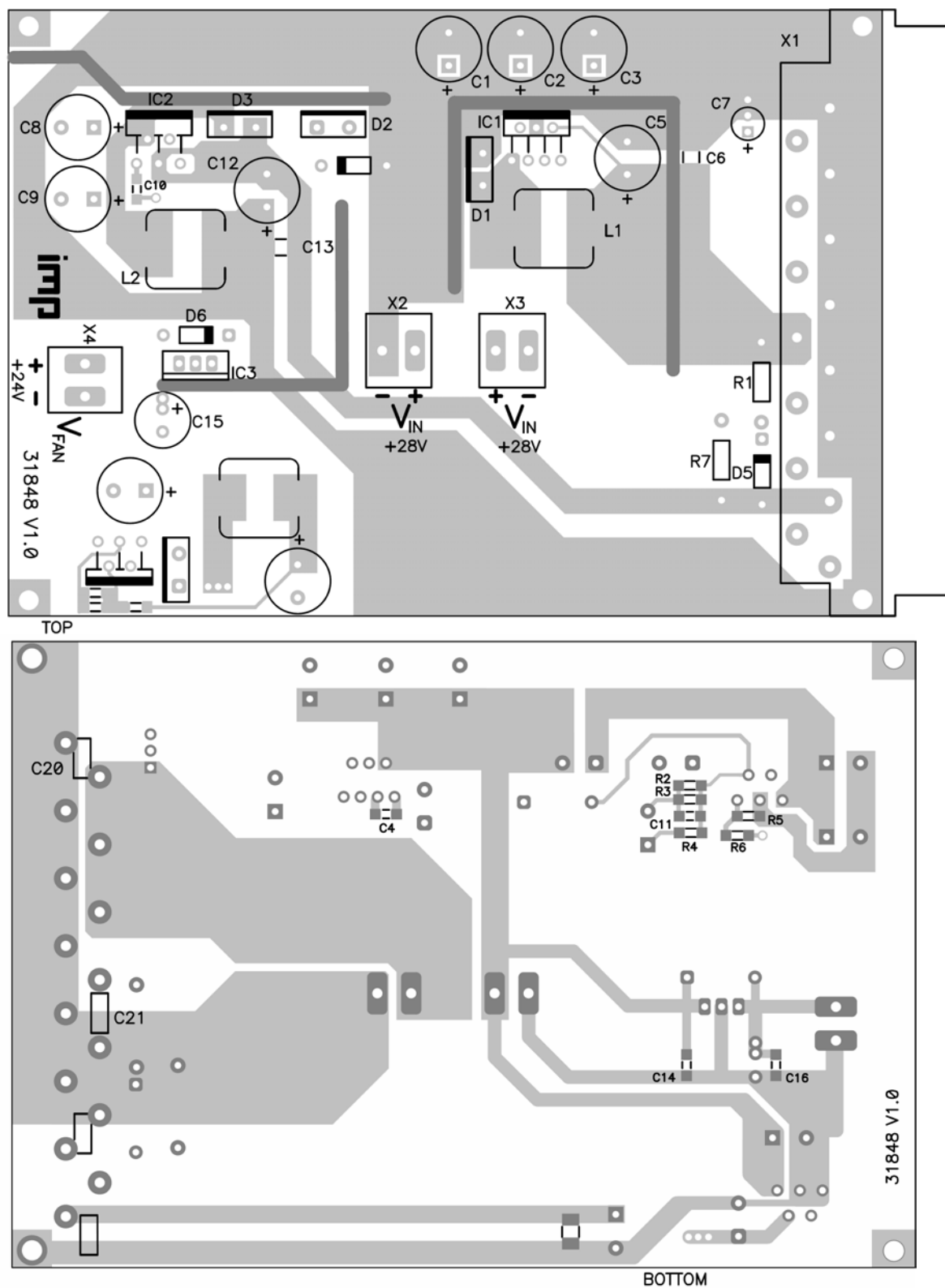
	Designation:	Stock No.	Page:		File:	
	POWER SUPPLY PS OTVP-100	32404	Date:	7.17.06	Disk:	
		803611745				

[illegible]

Pinout table for connector X1 (STV-H15-M):

Pin	Signal
4	GND
6	+28V/15A
8	GND
10	+28V/15A
12	GND
14	+28V/15A
16	GND
18	+12V/4A
20	GND
22	GND
24	GND
26	GND
28	-12V/1.2A
30	NC
32	+5V/0.8A

6. PCB for switching mode pow. supp. NS-12 V2.0 (31847)



7. Bill of material for PCB NS-12

Designation:	Stock No.	Page:	File:
PCB POWER SUPPLY NS-12 V2.0	31847	Date: 1.8.08	Disk:

No.	Pcs	Designstion	Stock No.	Signature	Rem./Ven.
2	1	PCB NS-12 V1.0	31848		IMP
4	1	VOLTAGE REGUL. LM2678T-12 TO-220-7 NSC	31864-385078018	IC1	NSC
6	1	VOLTAGE REGUL. LM2592HVT-A TO-220-7 NSC	31863-385078017	IC2	NSC
8	1	VOLTAGE REGUL. UA 7824 UC TO-220	6604-385078024	IC3	FAIRCHILD
9	3	DIODE MBR1060 (TO-220)	31865-385213107	D1,D2,D3	SEMIC
11	2	DIODE 1N4007	7146-385270007	D5,D6	DIOTEC
12	2	CHOKE 47 UH /3,8A 7447709470	31866-387904138	L1,L2	WURTH
14	1	CAP EL 470UF 25V R5 EEUF1E471	31868-383400026	C5	PANASONIK
16	2	CAP EL 330UF 63V 12X30 R5 RD SX	31791-383490104	C12,C17	ROEDERSTAIN
18	5	CAP EL 220UF 63V 10X20 R5 M	31870-383400075	C1,C2,C3,C8,C9	ROEDERSTAIN
20	1	CAP EL 100UF 35V 8X12 R3.5 M	5670-383400041	C15	ROEDERSTAIN
22	1	CAP EL 22UF 40V 6X11 R2 M	5664-383400032	C7	ROEDERSTAIN
23	3	CAP PL 0.1UF 63V MKT R5 J	31794-383925102	C20,C21,C22	SIEMENS,WIMA
24	1	CAP SMD 330NF 50V Z5U 1210 M	6224-384605330	C14	YAGEO
32	2	CAP SMD 470NF 50V Z5U 1206 M	6227-384605471	C6,C13	YAGEO
34	3	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C10,C11,C16	YAGEO
36	1	CAP SMD 10NF 50V X7R 1206 M	6213-384604101	C4	YAGEO
40	2	RESISTOR MFILM 464R 2.7X8 0.5W 1%	8365-391013464	R1,R7	YAGEO
44	2	RESISTOR SMD 47K 1206 0,25W 1%	8907-393012470	R5,R6	VITROHM
46	1	RESISTOR SMD 20K 1206 0,25W 1%	8898-393012201	R3	VITROHM
48	1	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R4	VITROHM
58	1	RESISTOR SMD 1K21 1206 0,25W 1%	8858-393011120	R2	VITROHM
90	3	TERMINAL 2-WAY MSQ02005 SAUR	3163-303351102	X2,X3,X4	SAURO
100	1	CONNECTOR STV-H15-M-VE 32 15-POL. 41	4733-373908251	X1	ERNI

8. Technical data for ADA600F

COSEL Unit type

ADA600F

Ordering information

ADA 600 F -24 -□

① ② ③ ④ ⑤

ADA





Recommended Noise Filter
NAC-20-472



High voltage pulse noise type : NAP series
Low leakage current type : NAM series
* The Noise Filter is recommended to connect with several devices.

① Series name
② Output wattage
③ Universal input
④ Output voltage
⑤ Optional
G : Low leakage current
E : Low leakage current and EMI class A
F : with Fan unit (only -24)
T : Vertical terminal block
J : Connector type
C : with Coating
R : Remote ON/OFF
N1 : DIN rail
W : Alarms and Redundant operation
Specification is changed at option, refer to Instruction Manual.

Please refer to derating curve, because the rated load current depends on cooling method that is convection cooling or forced air.

SPECIFICATIONS

	MODEL	ADA600F-24	ADA600F-30	ADA600F-36	ADA600F-48
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC 120 - 350 (AC64 or DC90 optionally available *6)			
	FREQUENCY[Hz]	50/60 (47 - 63) or DC			
	EFFICIENCY[%]	ACIN 100V 84typ (Io=100%)	86typ (Io=100%)	86typ (Io=100%)	86typ (Io=100%)
		ACIN 200V 86typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)	89typ (Io=100%)
	POWER FACTOR	ACIN 100V 0.99typ (Io=100%)			
		ACIN 200V 0.98typ (Io=100%)			
	INRUSH CURRENT[A]	ACIN 100V 20typ (Io=100%) (More than 3sec.to re-start)			
OUTPUT		ACIN 200V 40typ (Io=100%) (More than 3sec.to re-start)			
	LEAKAGE CURRENT[mA]	0.75max (60Hz, According to IEC60950 and DEN-AN) (Io=100%)			
	VOLTAGE[V]	24	30	36	48
	CURRENT[A]	ACIN 100V 14 (Peak 25) convection	11 (Peak 20) convection	9 (Peak 16.5) convection	6.5 (Peak 12.5) convection
		ACIN 100V 21 (Peak 25) forced air	16.5 (Peak 20) forced air	14 (Peak 16.5) forced air	10.5 (Peak 12.5) forced air
		ACIN 200V 15 (Peak 31) convection	12 (Peak 24.5) convection	10 (Peak 20.5) convection	7 (Peak 15.5) convection
		ACIN 200V 25 (Peak 31) forced air	20 (Peak 24.5) forced air	16.5 (Peak 20.5) forced air	12.5 (Peak 15.5) forced air
	LINE REGULATION[mV]	96max	120max	144max	192max
	LOAD REGULATION[mV]	150max	180max	240max	300max
	RIPPLE[mVp-p]	0 to +50°C 120max	160max	200max	200max
		-10 - 0°C 160max	230max	260max	300max
	RIPPLE NOISE[mVp-p]	0 to +50°C 150max	190max	230max	250max
		-10 - 0°C 180max	250max	280max	400max
	TEMPERATURE REGULATION[mV]	0 to +50°C 240max	300max	360max	480max
	DRIFT[mV]	96max	120max	144max	192max
PROTECTION CIRCUIT AND OTHERS	START-UP TIME[ms]	500max (ACIN 100V, Io=100%)			
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)			
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	21.6 - 27.0	27.0 - 33.0	33.0 - 41.0	41.0 - 52.8
	OUTPUT VOLTAGE SETTING[V]	23.5 - 24.5	29.0 - 31.0	35.0 - 37.0	47.0 - 49.0
	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	31 - 34.5	40 - 48	51 - 60	64 - 76
	OPERATING INDICATION	LED (Green)			
	ALARM OUTPUT	Detecting low input voltage(PF), detecting low output voltage(LV). (Optional : -W, refer to Instruction Manual 5)			
	REMOTE ON/OFF(RC)	Requirement for external source (Option : -R, refer to Instruction Manual 5)			
	INPUT-OUTPUT - RC	AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
ISOLATION	INPUT-FG	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT - RC-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)			
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +71°C, 20 - 90%RH (Non condensing) (Refer to DERATING CURVE), 3.000m (10.000feet) max			
ENVIRONMENT	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9.000m (30.000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s ² (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN and IEC60950-1 (At only AC input)			
	CONDUCTED NOISE	Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B			
	CE MARKING	Low Voltage Directive, EMC Directive			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2			
OTHERS	CASE SIZE/WEIGHT	65 x 127 x 195mm (W x H x D) (without terminal block) /1.5kg max			
	COOLING METHOD	Convection/Forced air			

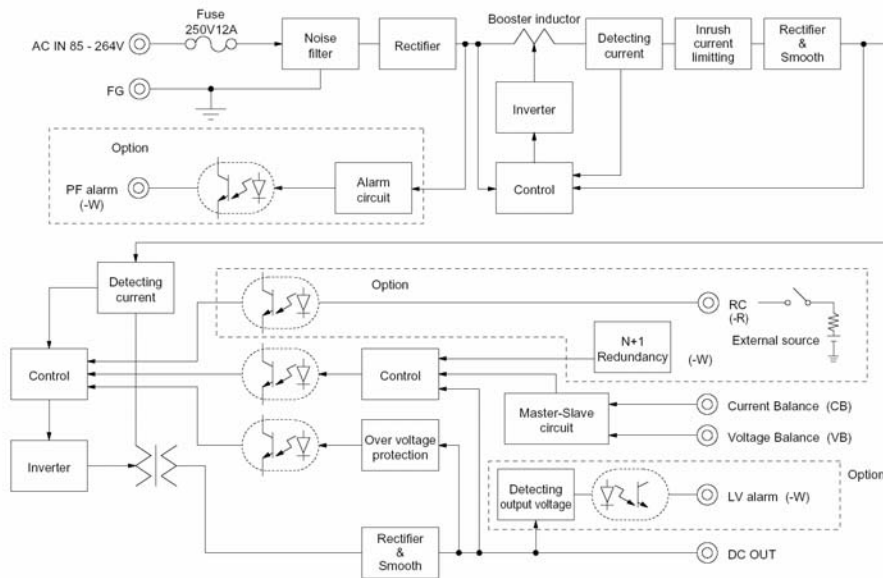
- *1 The value is primary surge. The current of input surge to a built-in noise filter (0.2ms or less) is excluded.
- *2 Peak loading for 10sec. And Duty 35% max. Refer to Instruction Manual 4. Forced air is shown in Instruction Manual 2.3.
- *3 This is the value that measured on measuring board with capacitor of 22 μF within 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to

- KEISOKU-GIKEN: RM101).
- *4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- *5 Applicable when remote control (optional) is added.
- *6 Derating is required. Consult us for details.
- * A sound may occur from power supply at pulse loading.

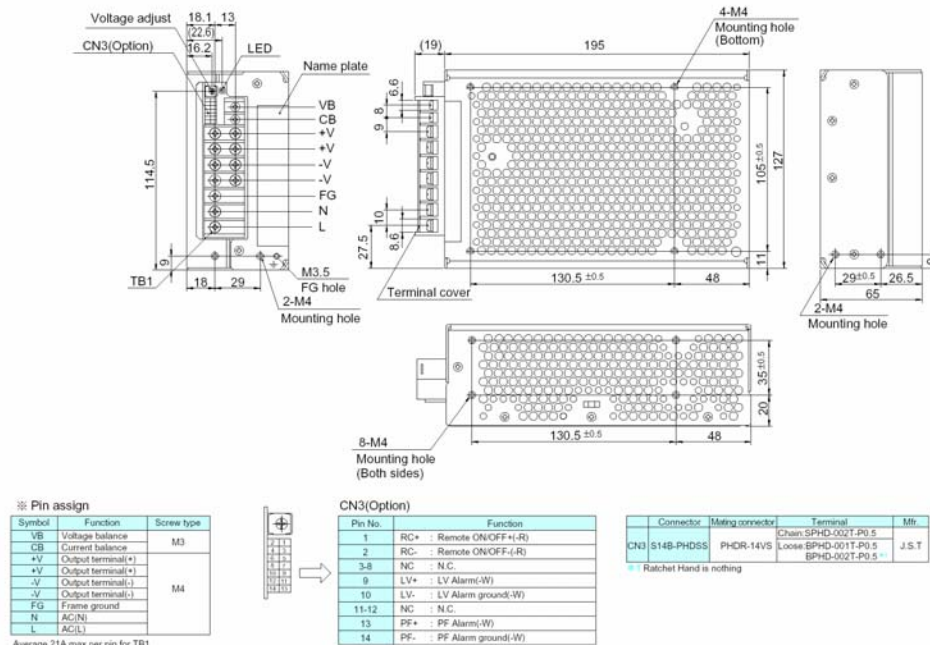
TRC Electronics, Inc. Tel: 973.779.8282 Fax: 973.779.1490 www.trcelectronics.com

ADA600F | COSEL

Block diagram



External view



TRC Electronics, Inc. Tel: 973.779.8282 Fax: 973.779.1490 www.trcelectronics.com

COSEL | Basic Characteristics Data

ADA Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
ADA600F	Active filter	85	5.9 (Peak 7.0)	250V 12A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								
ADA750F	Active filter	85	6.9 (Peak 11.8)	250V 20A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								
ADA1000F	Active filter	85	9.5 (Peak 18.2)	250V 25A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								

* Refer to Instruction Manual.

* The value of input current is at ACIN 100V and rated load (peak).

9. Technical data for LAMBDA

TDK-Lambda

SWS600/1000L



SWS600L model shown

Single Output Low Profile Power Supplies

- ◆ Low Cost
- ◆ Low Profile
- ◆ Active Power Factor Correction
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Low Acoustical noise
- ◆ Medical Certifications (SWS1000L)

RoHS

Key Market Segments & Applications

LED Signs	Test & Measurement
Automated Service	Medical equipment

Features and Benefits

Feature	Benefit
◆ Global safety Approvals	◆ Supports Global Use
◆ Power Factor Corrected	◆ Supports Global Use
◆ Variable speed fan	◆ Greater reliability & lower acoustical noise

Specifications

MODEL		SWS600L	SWS1000L
ITEMS			
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 350VDC	
Inrush Current (115 / 230VAC)	A	20 / 40	
Power Factor	-	Meets EN61000-3-2 Class A	
Input Current (100/200VAC)	A	7.1 / 3.6 (3.3V: 5 / 2.5)	12 / 6
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection	-	>105%, Constant current style	
Overvoltage Protection	V	125% -145%	
Overtemperature Protection	-	Yes, cycle AC or Remote On/Off to reset	
Hold Up Time (Typ)	ms	20ms at 115/230VAC	
Leakage Current (max)	mA	<0.75mA	100µA at 115VAC 60Hz(2)
Remote Sense	-	Yes	
Parallel Connection	-	Yes	
Remote On/Off (CNT)	-	Yes	
Voltage Programming (1)	-	Yes	
DC Good & Fan Fail Signal	-	Yes, open collector output	
Auxiliary Output	-	12V 0.1A	
LED Indicator	-	Green LED = On	
Operating Temperature	-	-40°C start up, -20 to 74°C, derating linearly to 50% load above 50°C	
Storage Temperature	-	-40 to +85°C	
Humidity (non condensing)	-	20 - 90% RH operating, 10 - 95%RH non operating	
Cooling	-	Variable speed internal fan	
Withstand Voltage(One minute)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, Output to CNT 100VAC	Input to Ground 2kVAC, Input to Output 4kVAC, Output to Ground 500VAC, Output to CNT 100VAC
Isolation Resistance	-	>50M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	MIL-STD-810F 514.5 Cat. 4, 10	
Shock (in packaging)	-	MIL-STD-810F 516.5 Procedure I, VI	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Certification	-	UL, CSA, EN60950-1, UL60601-1 (1000W only), IEC61010-1 (600W only), EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B	
Weight (Typ)	g	1600	2300
Size (WxHxD)	in	2.4 x 4.72 x 7.48"	2.4 x 5.91 x 9.45"
Warranty	yrs	Three Years	

(1) 1-6V program voltage input to adjust output 20-120% (typical) of nominal. See instruction manual for details & models with this feature.

(2) 300µA worse case, 265VAC 63Hz

TDK-Lambda

SWS600/1000L

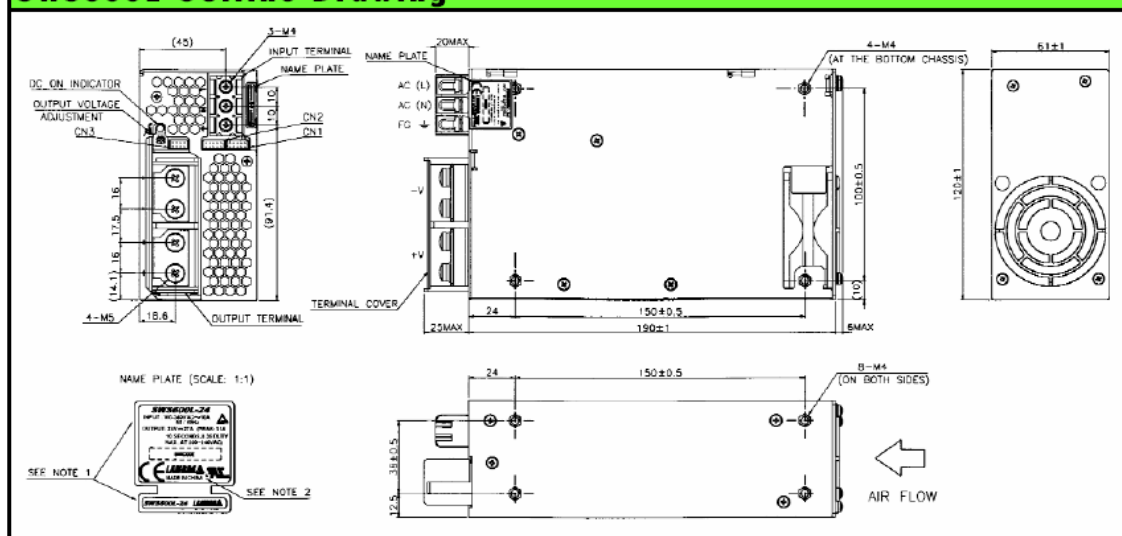
Model Selector

Model	Voltage	Adjust Range	Max Curr. (A)	Max Pwr (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Eff.(3) (typ)%
SWS600L-3	3.3V	2.64 - 3.96V	120A	396W	30	20	120	70 / 72
SWS1000L-3	3.3V	2.64 - 3.96V	200A	660W	30	20	120	74 / 76
SWS600L-5	5V	4 - 6V	120A	600W	30	20	120	75 / 77
SWS1000L-5	5V	4 - 6V	200A	1000W	30	20	120	79 / 81
SWS600L-12	12V	9.6 - 14.4V	53A	636W	72	48	150	79 / 82
SWS1000L-12	12V	9.6 - 14.4V	88A	1056W	72	48	150	82 / 84
SWS600L-15	15V	12 - 19.5V	43A	645W	90	60	150	79 / 82
SWS1000L-15	15V	12 - 19.5V	70A	1050W	90	60	150	82 / 84
SWS600L-24	24V	19.2 - 28.8V	27A (31A) ⁽⁴⁾	648W(744W)	144	96	150	81 / 84
SWS1000L-24	24V	19.2 - 28.8V	44A (51A) ⁽⁴⁾	1056W(1224W)	144	96	150	84 / 86
SWS600L-36	36V	28.8 - 43.2V	18A	648W	216	144	200	82 / 84
SWS1000L-36	36V	28.8 - 43.2V	29A	1044W	216	144	200	84 / 86
SWS600L-48	48V	38.4 - 56V	13A (15A) ⁽⁴⁾	624W(720W)	288	192	200	82 / 84
SWS1000L-48	48V	38.4 - 56V	22A (25A) ⁽⁴⁾	1056W(1200W)	288	192	200	84 / 86
SWS600L-60	60V	48 - 66V	10A	600W	360	240	200	82 / 84
SWS1000L-60	60V	48 - 66V	17A	1020W	360	240	200	84 / 86

Notes: (3) 115 / 230VAC

(4) Peak current and power possible at 170-26VAC input, 10s max, 35% duty cycle

SWS600L Outline Drawing



Other Industrial Products

SWS	50 - 300W Single Output
HWS	15 - 1800W Single output, high reliability
ZWS	5 - 240W pcb style single, output
DLP, DPP, DSP	10 - 480W DIN Rail mount
LS	25 - 200W Single output, low cost

For Additional Information, please visit us.tdk-lambda.com/lp/products/sws-series.htm

4. Power Amplifier Module PAM-3/500

POWER AMPLIFIER 500W VHF Type PAM - 3/500

Electric diagram: 41595

Description

Final RF Power Amplifier stage is solid state and broad band designed in VHF frequency range (III TV band). RF signal is divided in Wilkinson divider as 4-way divider, then is amplified in four power amplifiers NIO 3/200 (AB class). After amplifying four RF signals are combined in Wilkinson combiner as 4-way-combiner. Complete gain is 13dB.

The Power Amplifier PAM-3/500 consists of:

- four power amplifiers NIO-3/200
- two switch-mode power supply AC/DC converter
- directional coupler for measuring Pout and Prefl.
- Wilkinson divider and combiner
- PCB MCU-PAM and PCB Switch-On

The module is air-cooled and incorporates two fans for this purpose.

Overheating:

Two electronic protection circuits with temperature sensor LM 75, that are fixed on the heat sink switch off the voltage of the SMPS AC/DC converter. Red LED (Th) on the front plate light on.

Supply voltage 230V is introduced through to Euro socket X1, which incorporates fuse, and is led via PCB Switch-on to the switch-mode power supply AC/DC converter, which incorporates an EMI filter.

The amplifier module incorporates PCB MCU-PAM, which controls the electric and thermic parameters of modul and also provides communications via RS-485 with Exciter module. By means of PCB Switch-on controls operation of AC/DC converter. PCB has own power supply unit DSP30-15, which supply also a AC/DC converter with auxiliary voltage used for regularly operation.

The unit also incorporates the test circuitry for metering the output and reflected power, as well as protective circuitry against the occurrence of reflected power. If reflected power rises beyond 100W (20%), the corresponding circuitry will cut the power supply for the stage.

This blockade persists until the restarting of the output amplifier. This is done automatically, via the basic transposer/transmitter, in the case when the operation of the main transmitter is interrupted, or manually, by means of the switch "Auto/Manual (ON)". If the fault due to "reflected power" has been removed, the amplifying stage will be started as appropriate; if reflected power persists, on the other hand, the procedure of starting the amplifying stage cannot be initiated.

If output power falls below a set value (-4dB), this is indicated by Pout LED (red); at the same time, this signal is also sent to the connector 16X2, pin 1, and can be used for triggering the switch-over automatic circuitry.

Reflected power is known to usually occur in the case of the frosting of transmitting antennas, which may persist over a longer period of time (a few hours to a few days), or of faulty transmission coaxial cable (normally a persistent fault).

Current measurements of Power Output Stages are carried out by means of voltages drop on the resistors R2, R3, R4 and R5, which are located on the PCB 'Resistors'

PCB 'Resistors' incorporates precision resistors 20mohm for indirect measurement of current of cassettes NIO-3/200 -1,2,3,4-. Voltage drop on these resistors is processed by MCU and indirectly shows the current of cassettes.

Output of the power amplifier is connected to band pass filter provided, to attenuate harmonic frequencies. To reach the required attenuation of products of vision+sound and vision-sound, two suction circuits are also added, which may be adjusted as necessary.

Setting:

The entire power amplifier has been set as appropriate and tested by the manufacturer (output voltages of switching power supplies are set by means of potentiometers P2 to 32V). Additional settings are not required.

Troubleshooting:

In case of failure:

- Check for proper operation of the switching power supply AC/DC converter ($U_{out} = 32V$);
- Use polyscope to check gain, input and output matching of the entire unit and of cassettes NIO-3/200 (approx. 12dB);
- If a power supply unit is faulty, repair or replace it;
- If power amplifying cassette is faulty, replace it (them);
- Before incorporating a new cassette, check the same by polyscope (gain, matching);
- Ensure that the cassette will fit closely to the surface of the cooling section and that contact surfaces will be coated by heat-conductive paste. For repair of damaged cassettes refer to the manufacturer (IMP Telekom);
- A fault may also occur on connecting cables.

On the front panel, one BNC connector is provided for a test point of approx. 1V RF signal.

LEDs indicate:

LED 1 (green): Module ON

LED 2 (red): faults

LED3 (red): exceeding of temperature (approx. 60°C)

LED4 (green): not illuminated in the case of excessively low or high input signal for the module

LED5 (green): indicated a proper power and correct transmission

LED6 (red): illuminated in the case of excessive reflected power at the output from the module

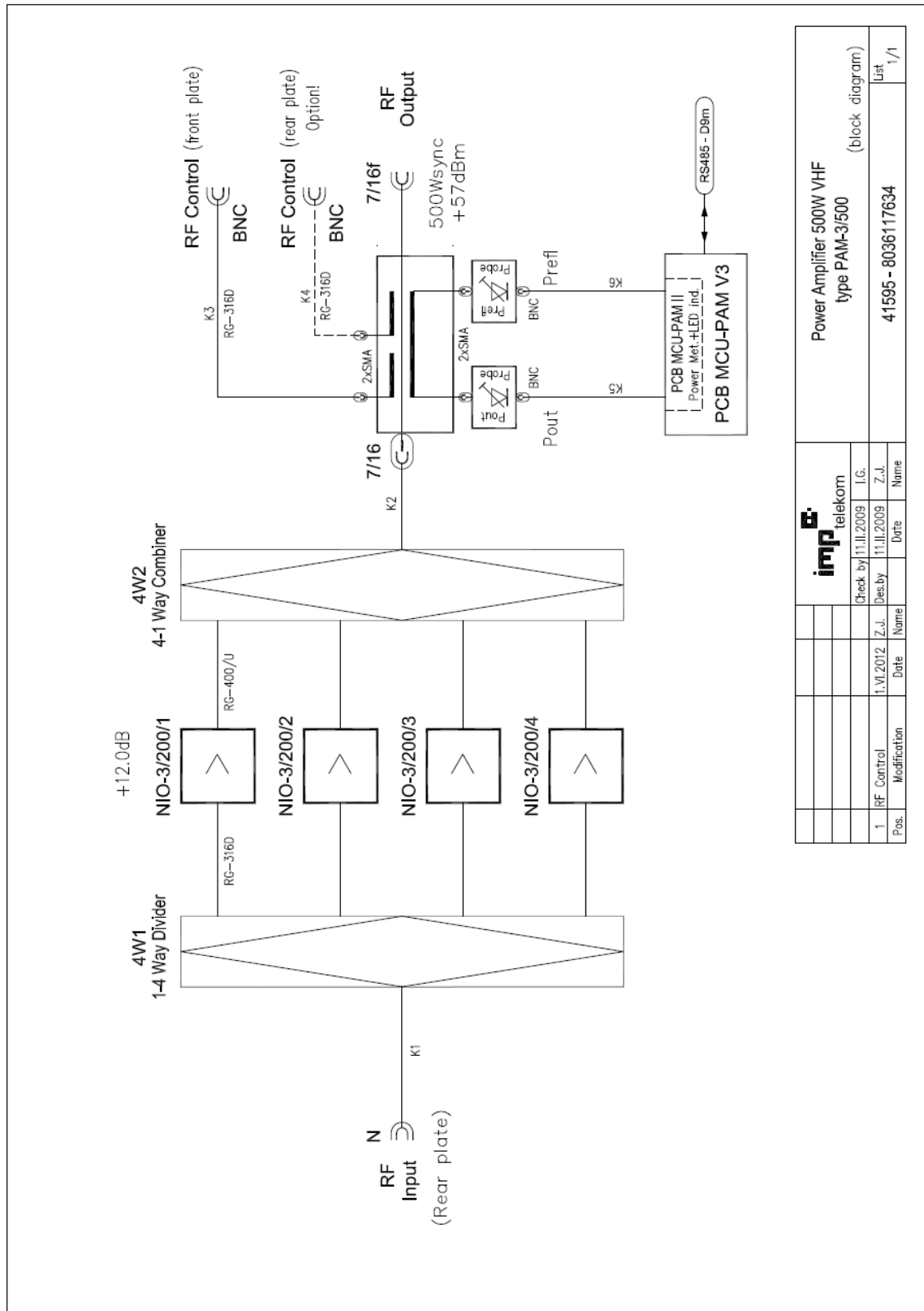
Maintenance:

Once per year the visual fan check is recommended – the fan should be clean.

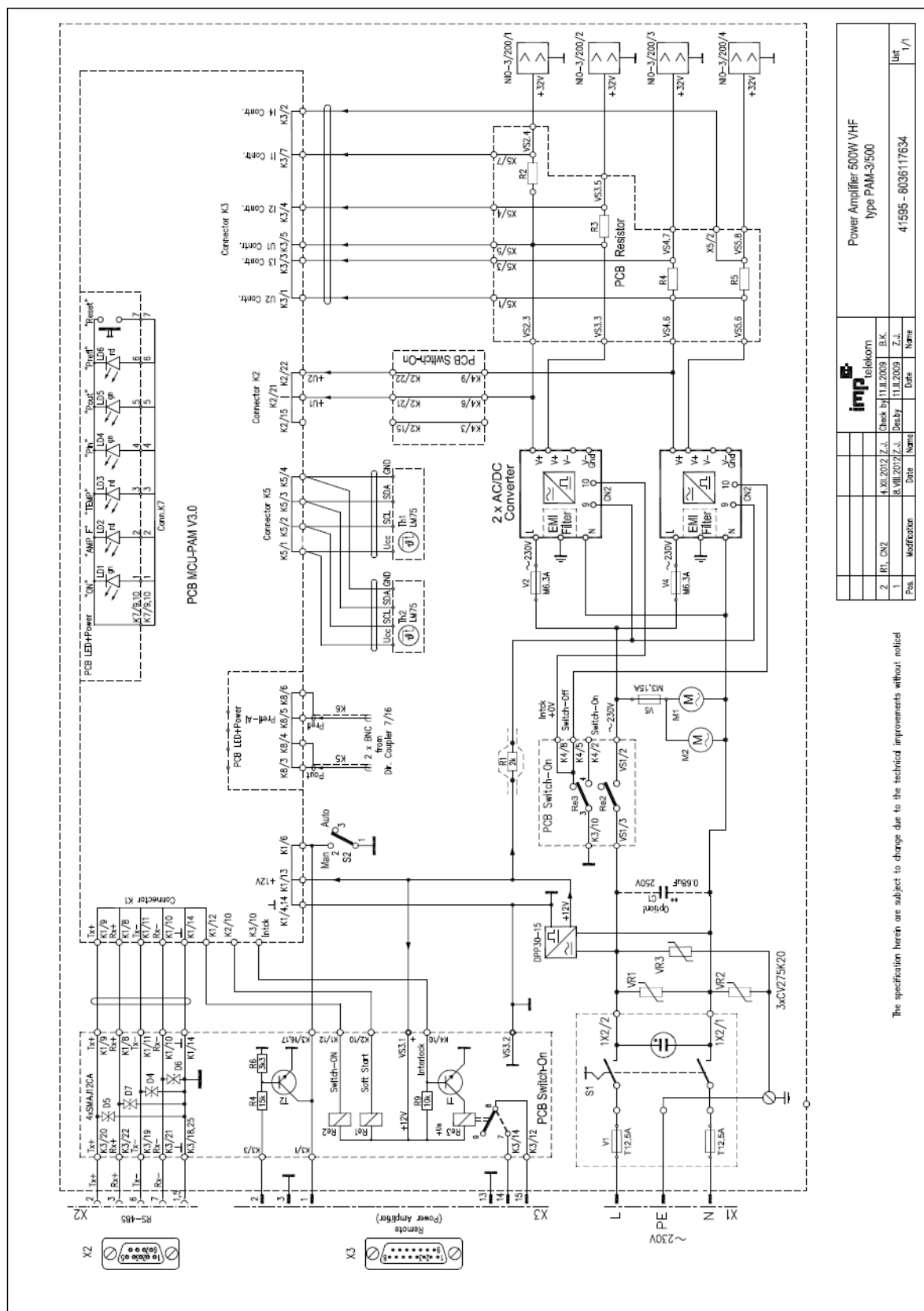
Technical Characteristics:

-	Frequency range	170 - 230 MHz
-	Input and output impedance	50 Ohm
-	Input matching	< - 14dB
-	Output power	500 W
-	Cross modulation	< - 50dB
	Pref = 500W (-8/-10/-16)	
-	Gain	> 11dB
-	Supply voltage: single phase	184V to 276V
-	Power consumption	aprox. 1600 VA (depends on channel)
-	Ambient temperature	-5°C...+45°C
-	Max. load VSWR	1.3 (regular)
-	Fan life	4,5 years at 40°C (Producer's technical data)
-	Weight	approx. 33 kg
-	Dimensions	482 x 221 x 600 w x h x d (with sliding carriage)

Block diagram



Electrical diagram



483 mm (19")

221 mm (8 3/4")

PAM-3/500

imp-telekom

Front View

Rear View

Top View

RF Input

RF Output

Power Amplifier 500W VHF type PAM-3/500

41595 - 8036117634

The specification herein are subject to change due to the technical improvements without notice

	1	2	3	4																																																
A	Connector X2 (Bus RS-485) Pin Assignments:																																																			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pin</th> <th>Direct.</th> <th>Function:</th> <th>Remark:</th> </tr> </thead> <tbody> <tr> <td>2</td> <td style="text-align: center;">→</td> <td>TxA (Tx+)</td> <td></td> </tr> <tr> <td>3</td> <td style="text-align: center;">←</td> <td>RxA (Rx+)</td> <td></td> </tr> <tr> <td>6</td> <td style="text-align: center;">→</td> <td>TxB (Tx-)</td> <td></td> </tr> <tr> <td>7</td> <td style="text-align: center;">←</td> <td>RxB (Rx-)</td> <td></td> </tr> <tr> <td>1,5</td> <td style="text-align: center;">○</td> <td style="text-align: center;">⊥</td> <td>0V Gnd</td> </tr> </tbody> </table>				Pin	Direct.	Function:	Remark:	2	→	TxA (Tx+)		3	←	RxA (Rx+)		6	→	TxB (Tx-)		7	←	RxB (Rx-)		1,5	○	⊥	0V Gnd																								
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Bill of material

Designation:	Stock No:	Date:	22.2.2012
POWER AMPLIFIER MODULE VHF PAM-3/500	45579		

No IMP	Pcs	Designation	Stock No.	Signature	Rem. / Ven.
2	1	HOUSING KSMC-3/500	32159		IMP
4	4	PCB POWER AMPLIFIER NIO-3/200	26183-803561746	-1-; -2-; -3-; -4-	IMP
6	1	DIVIDER /COMBINER 4-WAY 100W VHF	24975-802610207	4W1	IMP
8	1	DIVIDER /COMBINER 4-WAY 1KW VHF	24974-802610206	4W2	IMP
10	1	POWER SUPPLY 15V TYPE DSP30-15	34131-389050117		LAMBDA
12	2	POWER SUPPLY 28V; 12.5A SWS600L-24	44822-3890501282		LAMBDA
12b	2	CONNECTOR 14-POL (F) PHDR-14VS JST	34877-373908330		JST
12c	4	PIN FEM. SPHD-001T-P0.5	34878-373908331		JST
14	1	PCB RELAY-KSMC V2.0	33615		IMP
16	1	DIRECTIONAL COUPLER UHF	26509-803610253		IMP
18	1	PCB MCU-PAM V V3.0	30977-803562030	B163	IMP
20	1	PCB MCU-PAM II V V3.0	30978-803562031	B163	IMP
22	2	PCB TEMPERATURE SENSOR PAM V3.0	30979-803562032	Th1, Th2	IMP
24	1	PCB RESISTOR 5 PAM V2	18484-800551959		IMP
28	4	RESISTOR MP930 30W 5% TO-220 0R02	5327-382480002	(PCB Resistor) R2 - R5	CADDOK
30	3	RESISTOR MFILM 2k 0,5W 1%	8392-391014200	R1	VITROHM
48	1	RF CABLE OUTPUT (N-R)	23607-801570811	(RF Input)	IMP
50	1	RF CABLE CONTROL V4 (BNC-R)	31204-801570986	(RF Control)	IMP
52	1	SIGNAL CABLE Pout, Prefl	34117-801571055	(Control)	IMP
54	1	RF CABLE PROBE ALC – MCU (SMA-R)	31627-8015709972	(ALC Probe)	IMP
100	2	FAN AXIAL φ150 TYP 7855 ES	9024-454148133	M1; M2	EBM-Papst
102	1	INLET POLYSNAP 250Vac, RZ01011	34682-373908234	X1	OMEGA
104	3	VARISTOR CV275K20	6976-385105043	VR1, VR2, VR3	ISKRA
106	1	SWITCH type STK-H 8600, BLACK	3614-310058111	S1	OMEGA
108	2	FUSE 5x20, T12,5A, DIN41571	33948-332051402	V1 (Inlet)	Wickmann
110	1	FUSE 5x20, M3,15A, DIN41571	4044-332044102	V5 (Fans)	Wickmann
112	2	FUSE 5x20, M6,3A, DIN41571	41911-332045111	V2, V3 (AC/DC)	Wickmann
114	3	FUSE HOLDER OV-10	4075-332052109	V2, V3, V5	Wickmann
116	4	TERMINAL 2-P MSQ02005 R=5.08	3163-303351102		SAURO
118	1	TERMINAL 3-P MSQ03005	3161-303351030		SAURO
120	1	CABLE FLAT 26-P TES SW-MCU	33940-801571044	(PCB Switch-PCB MCU)	IMP
122	1	CABLE FLAT 26-P D9+D15 TES SW-RP	33942-801571046	(PCB Switch-Rear Pl)	IMP
124	1	CABLE FLAT 14-P TES KON-MCU	31629-801570942	(PCB MCU – PCB REL)	IMP
126	1	CABLE FLAT 10-P TES RES-MCU	33941-801571045	(PCB MCU – PCB RES)	IMP

4.1 MCU-PAM V V3.0

1. Description	2
2. Electrical diagram for MCU-PAM V (Microcontroller & digital section)	3
3. Electrical diagram for MCU-PAM V (Supply & Current Analog Inputs)	4
4. Electrical diagram for MCU-PAM V (RF Mettering Analog Inputs)	5
5. Electrical diagram for MCU-PAM V (Power Supply, Reference, Digital Outputs)	6
6. Electrical diagram for MCU-PAM V (Current Monitoring)	7
7. PCB for MCU-PAM V V3.0	8
8. Bill of material for MCU-PAM V V3.0	10
9. Pin Assignments of PCB MCU-PAM V V3.0	13

1. Description

MCU – PAM

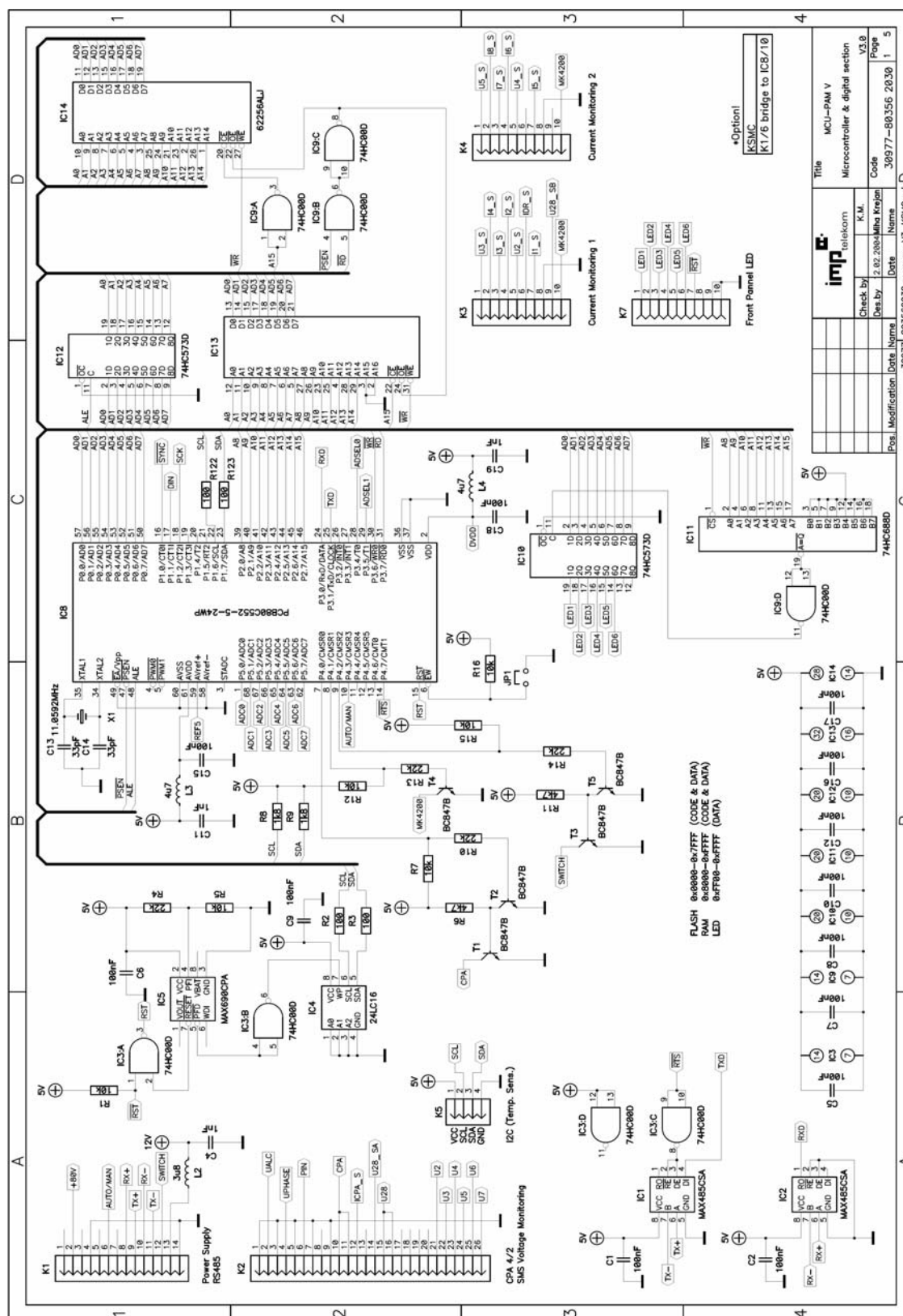
Electrical Diagram (803562030)

MCU-PAM is used to control and monitor operation of power amplifier module. Output power, current of each power cassette, power supply voltages and temperature of module are monitored. Protection against high temperature is implemented. At UHF modules (except PAM 4/1600 and PAM 4/100D) the most important task is automatic level control to maintain stable output power under different conditions. Also at UHF modules protection from excessive reflection is done by microcontroller. Monitoring and settings is done through RS485 serial interface with main Microcontroller Unit. Each module has its own address and thus can be identified on the RS485 network. Settings reside in EEPROM that need no electrical power for storage. Firmware is stored in flash memory and can be upgraded through RS485 interface.

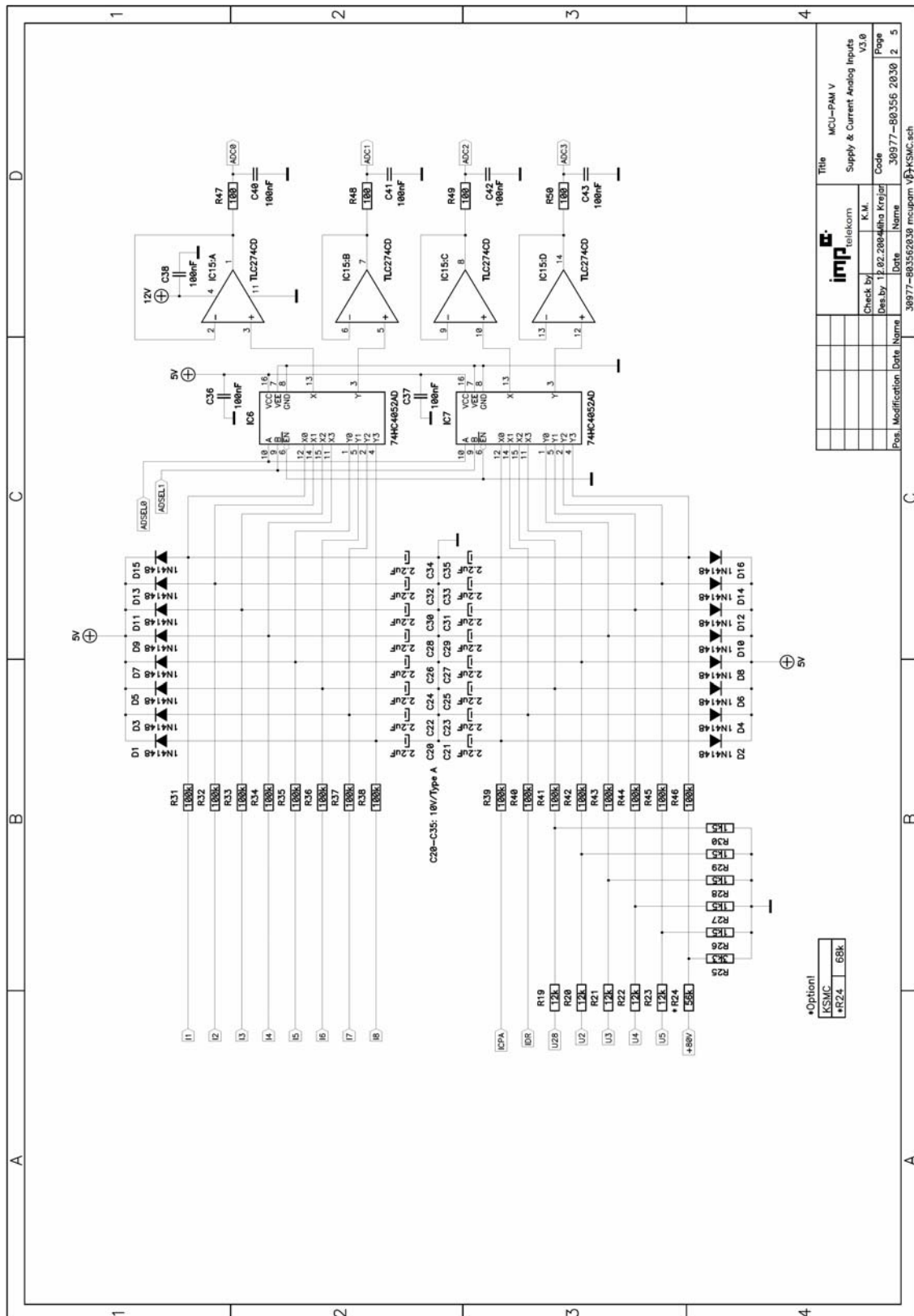
MCU-PAM is based on microcontroller 80C552 (IC8). There is flash memory for firmware IC13 and additional working RAM memory (IC14). Settings are stored in EEPROM (IC4). IC5 prevents data corruption during insufficient supply voltage. RS485 communication is connected through connector K1 and its drivers are IC1 and IC2. Driver for signal LED diodes is IC10. IC11 and IC9 form address decoder logic. Analog signals are multiplexed with IC6, IC7 and IC16 and buffered with IC15 and IC17 before they are taken to the microcontroller's A/D converter. Module for measuring RF power is connected to K6. I²C temperature sensors are connected to K5. Current sensing is done with current to voltage converters (IC22-IC31 and IC32 as supply generator). D/A converters for automatic level control and phase shifting (IC18) has voltage outputs that are buffered with IC20. IC20:B and T8 multiply output voltage from D/A converter for phase shifting (UPHASE). Digital supply voltage is converted from 12V to 5V with IC33. Reference voltage (REF5) for D/A converters and A/D converter in microcontroller are generated with IC19.

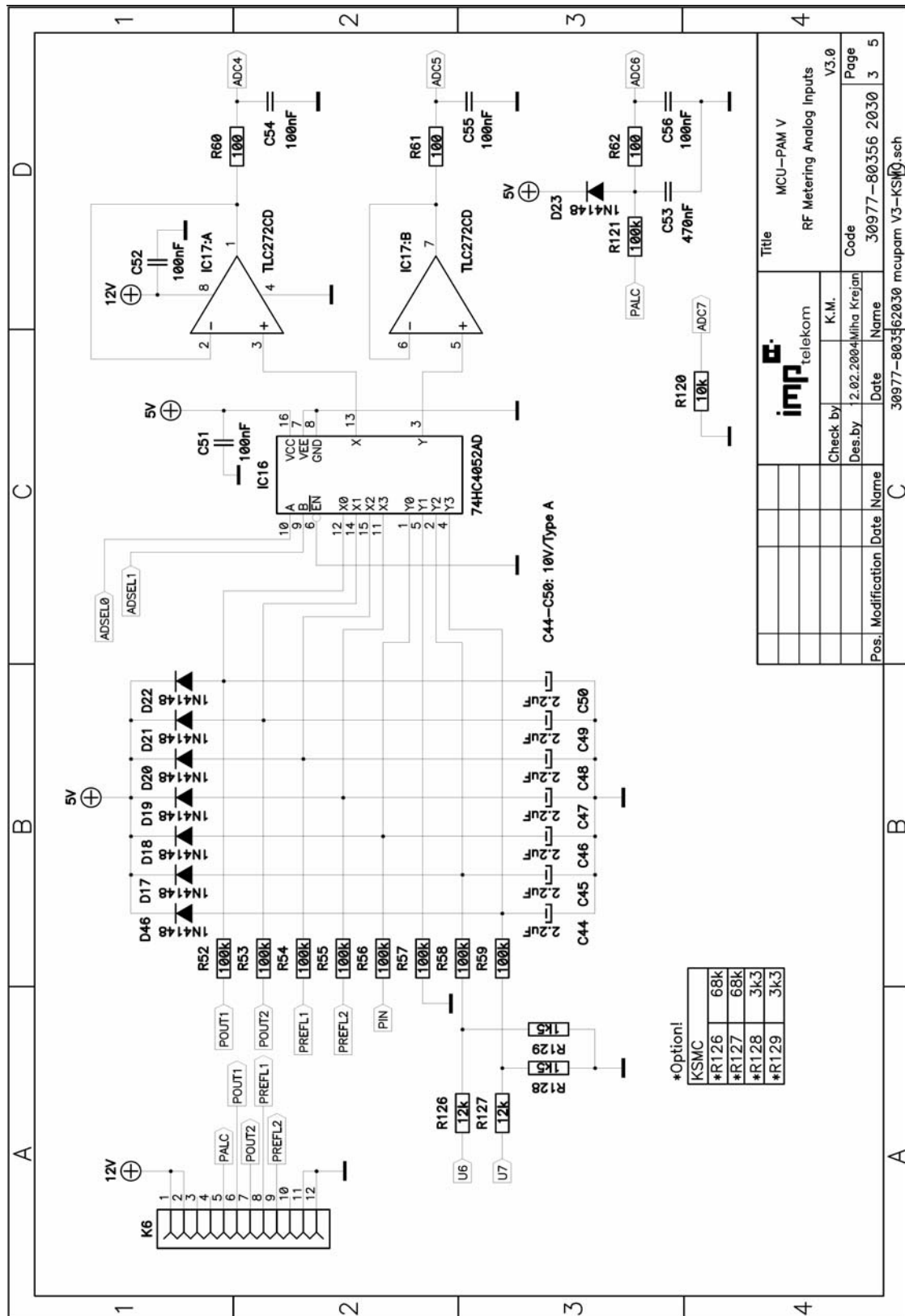
MAINTENANCE:

No maintenance is required.

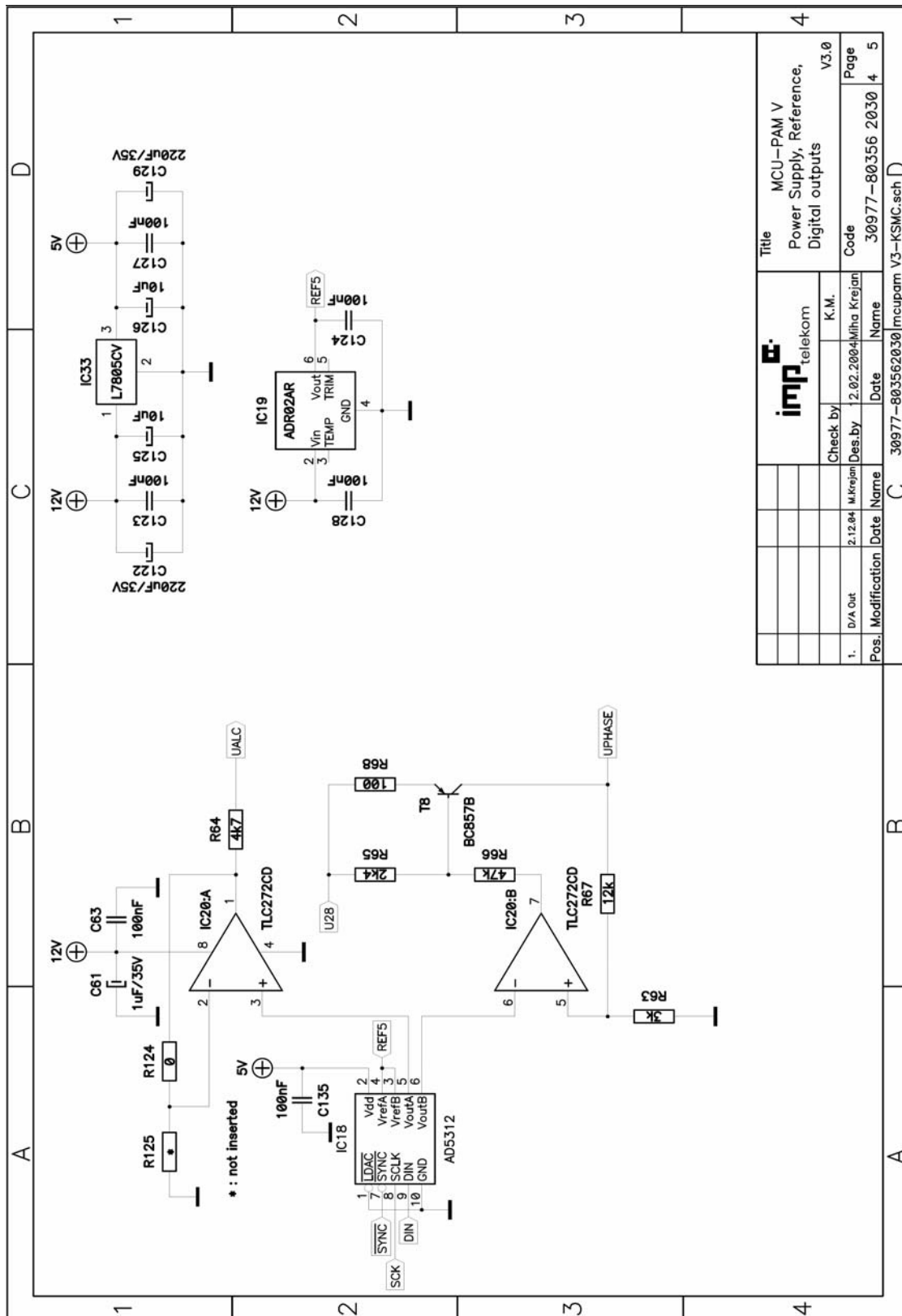
3

3. Electrical diagram for MCU-PAM V (Supply & Current Analog Inputs)

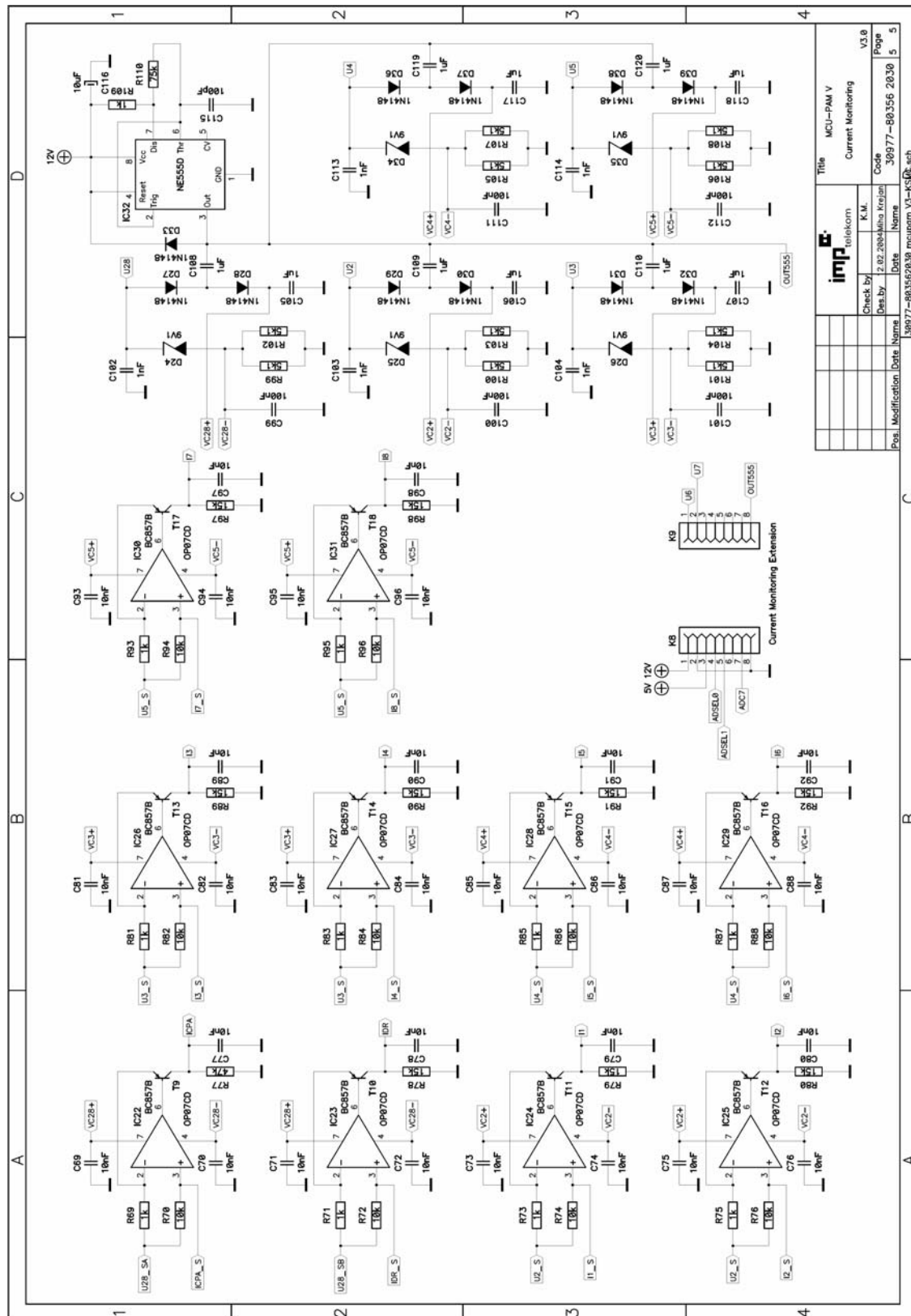


5

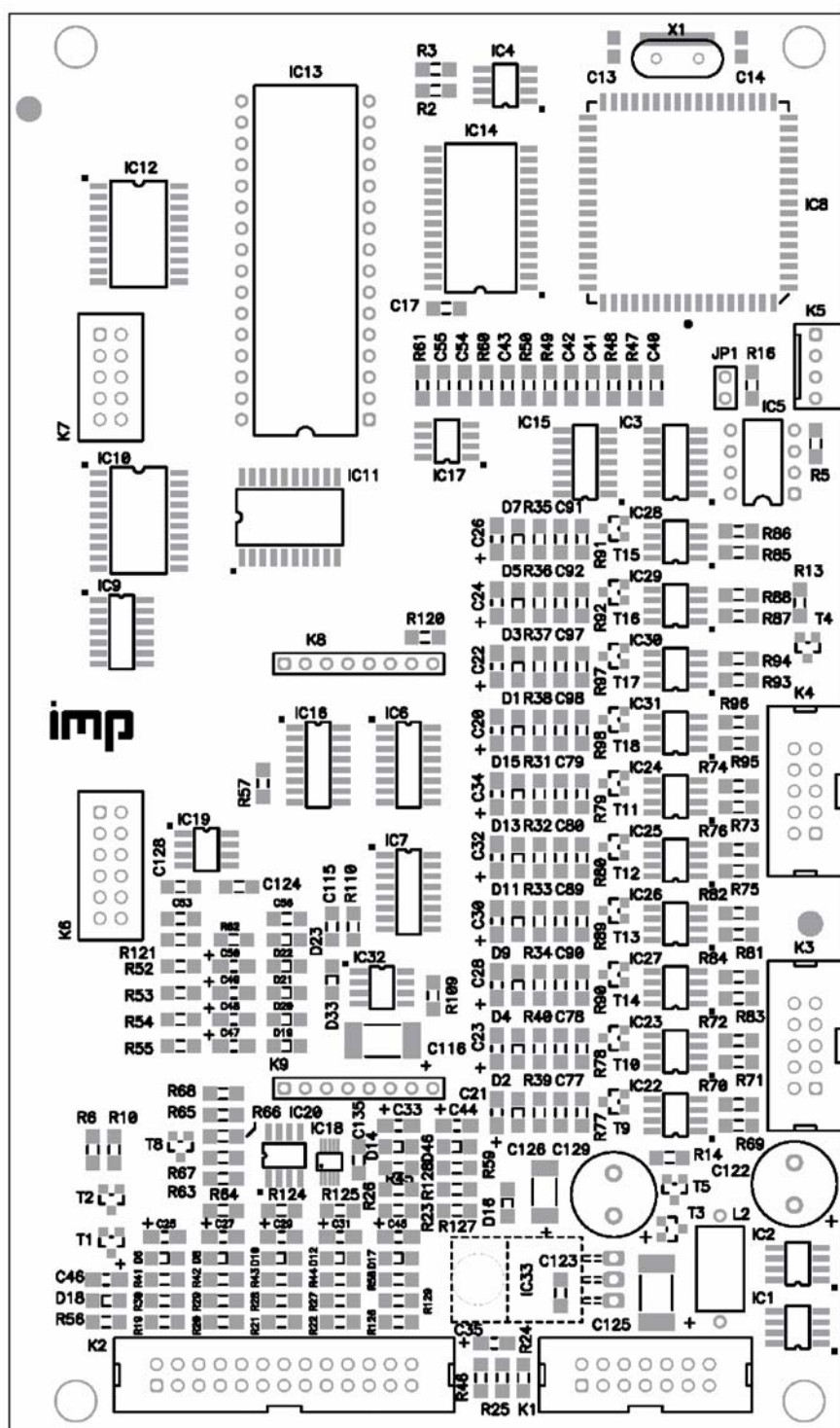
5. Electrical diagram for MCU-PAM V (Power Supply, Refence, Digital outputs)



6. Electrical diagram for MCU-PAM V (Current Monitoring)



7. PCB for MCU-PAM V V3.0



TOP

PCB MCU PAM V V3.0
80356 2030



8. Bill of material for MCU-PAM V V3.0

Designation:	Stock No.:	Page:	File:
PCB MCU-PAM V V3.0	803562030	Date: 7.18.05	Disk:
	31531(STS)		

No.	Pcs.	Designation:	Stock No.:	Signature	Rem./Ven.
2	1	PCB MCU-PAM V V3.0	30980-800552100		IMP
4	1	IC SMD 80C552-5-24 PLCC68	6616-385078552	IC8	PHILIPS
6	1	IC SRAM 62256 ALJ SOP-28	6535-385072758	IC14	CYPRESS
8	1	IC AT 24C16 SO8	6811-385088241	IC4	ATMEL
10	1	IC M29F010B PDIP-32	6534-385072757	IC13	ST
12	2	IC SMD 74HC00D SO14	6570-385075600	IC3,IC9	PHILIPS
14	1	IC SMD 74HC688D SO20	6589-385075988	IC11	PHILIPS
16	2	IC SMD 74HC573D SOT163-1	6588-385075873	IC10,IC12	PHILIPS
18	3	IC SMD 74HC4052D SO16	6582-385075820	IC6,IC7,IC16	PHILIPS
20	1	VOLTAGE REGUL. LM 7805 CT TO-220	6844-385088805	IC33	NSC
22	1	IC ADR02 AR SO8	6815-385088254	IC19	AD
24	1	IC AD 5312 MSOP-10 AD	30985-385095007	IC18	AD
26	1	IC SMD NE 555 D SO8	6842-385088557	IC32	PHILIPS
28	10	OP. AMP. SMD OP 07 CD SO-8	6621-385080026	IC22,IC23,IC24,IC25,IC26,IC27,IC28,IC29,IC30,IC31	AD
30	1	IC MAX 690 CPA DIP-8	6822-385088288	IC5	MAXIM
32	2	IC SMD MAX 485 CSA SO8	6819-385088285	IC1,IC2	MAXIM
34	2	IC TLC 272 BCD SO8	6666-385083272	IC17,IC20	TI
36	1	IC TLC 274 CD SO14	30984-38583274	IC15	MAXIM
38	5	TRANS SMD (NPN) BC 847B	6476-385046848	T1,T2,T3,T4,T5	PHILIPS
40	11	TRANS SMD (PNP) BC 857 B	6318-385010856	T8,T9,T10,T11,T12,T13,T14,T15,T16,T17,T18	PHILIPS
42	35	DIODE SMD LL4148 MELF	7167-385290148	D1,D2,D3,D4,D5,D6,D7,D8,D9,D10,D11,D12,D13,D14,D15,D16,D17,D18,D19,D20,D21,D22,D23,D27,D28,D29,D30,D31,D32,D33,D36,D37,D38,D39,D46	PHILIPS
44	5	DIODE ZENSMD BZV55/C9V 9V1 SOD80	7019-385209091	D24,D25,D26,D34,D35	SIEMENS
46	1	QUARC KRISTAL HC-49/U-S 11.0592	7444-386084102	X1	IC

	Designation:	Stock No.:	Page:		File:	
	PCB MCU-PAM V V3.0	803562030	Date:	7.18.05	Disk:	
		31531(STS)				

No.	Pcs.	Designation:	Stock No.:	Signature	Rem./Ven.
48	30	CAP SMD 10NF 50V X7R 1206 M	6213-384604101	C69,C70,C71,C72,C73,C74,C75,C76,C77,C78,C79,C80,C81,C82,C83,C84,C85,C86,C87,C88,C89,C90,C91,C92,C93,C94,C95,C96,C97,C98	YAGEO
50	2	CAP EL 220UF 35V 10X12 R5 T	5671-383400042	C122,C129	ROEDESTEIN
52	10	CAP SMD 1UF 50V X7R 2220 M	6228-384606100	C105,C106,C107,C108,C109,C110,C117,C118,C119,C120	YAGEO
54	1	CAP TANSMD 1UF 35V B M	6239-384650100	C61	KEMET
56	23	CAP TANSMD 2.2UF 10V A M	6240-384650219	C20,C21,C22,C23,C24,C25,C26,C27,C28,C29,C30,C31,C32,C33,C34,C35,C44,C45,C46,C47,C48,C49,C50	KEMET
58	1	CAP TANSMD 10UF 16V C M	6244-384651009	C126	KEMET
60	2	CAP TANSMD 10UF 35V D M	6246-384651011	C116,C125	KEMET
62	1	CAP SMD 100PF 50V CG 1206 K	6187-384602101	C115	YAGEO
64	8	CAP SMD 1NF 50V CG 1206 J	6204-384602999	C4,C11,C19,C102,C103,C104,C113,C114	YAGEO
66	36	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C1,C2,C5,C6,C7,C8,C9,C10,C12,C15,C16,C17,C18,C36,C37,C38,C40,C41,C42,C43,C51,C52,C54,C55,C56,C63,C99,C100,C101,C111,C112,C123,C124,C127,C128,C135	YAGEO
68	1	CAP SMD 470NF 50V Z5U 1206 M	6227-384605471	C53	YAGEO
70	2	CAP SMD 33PF 50V CG 0805 K	6178-384601330	C13,C14	YAGEO
72	2	COIL SIMID01 4.7UH B82412A1472	7570-387800470	L3,L4	SIEMENS
*73	1	CHOKE FERITNA D6L 3C 3,8 UH-02	5115-373980101	L2	ISKRA-FERITI
74	1	RESISTOR SMD 0R 1206 0,25W 1%	8801-393009001	R124	VITROHM
76	12	RESISTOR SMD 100R 1206 0,25W 1%	8833-393010100	R2,R3,R47,R48,R49,R50,R60,R61,R62,R68,R122,R123	VITROHM
78	11	RESISTOR SMD 1K 1206 0,25W 1%	8856-393011100	R69,R71,R73,R75,R81,R83,R85,R87,R93,R95,R109	VITROHM
80	7	RESISTOR SMD 1K5 1206 0,25W 1%	8861-393011150	R26,R27,R28,R29,R30,R128,R129	VITROHM
82	2	RESISTOR SMD 1K82 1206 0,25W 1%	8864-393011180	R8,R9	VITROHM
84	1	RESISTOR SMD 2K43 1206 0,25W 1%	8869-393011240	R65	VITROHM
85	1	RESISTOR SMD 3K01 1206 0,25W 1%	8871-393011300	R63	VITROHM

	Designation:	Stock No.:	Page:		File:	
	PCB MCU-PAM V V3.0	803562030	Date:	7.18.05	Disk:	
		31531(STS)				

No.	Pcs.	Designation:	Stock No.:	Signature	Rem./Ven.
86	1	RESISTOR SMD 3K3 1206 0,25W 1%	8874-393011331	R25	VITROHM
88	3	RESISTOR SMD 4K75 1206 0,25W 1%	8879-393011470	R6,R11,R64	VITROHM
90	10	RESISTOR SMD 5K11 1206 0,25W 1%	8880-393011510	R99,R100,R101,R102,R103,R104,R105,R106,R107,R108	VITROHM
92	17	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R1,R5,R7,R12,R15,R16,R70,R72,R74,R76,R82,R84,R86,R88,R94,R96,R120	VITROHM
94	8	RESISTOR SMD 12K 1206 0,25W 1%	8891-393012120	R19,R20,R21,R22,R23,R67,R126,R127	VITROHM
96	4	RESISTOR SMD 22K 1206 0,25W 1%	8899-393012220	R4,R10,R13,R14	VITROHM
100	1	RESISTOR SMD 56K 1206 0,25W 1%	8909-393012561	R24	VITROHM
102	25	RESISTOR SMD 100K 1206 0,25W 1%	8914-393013100	R31,R32,R33,R34,R35,R36,R37,R38,R39,R40,R41,R42,R43,R44,R45,R46,R52,R53,R54,R55,R56,R57,R58,R59,R121	VITROHM
104	9	RESISTOR SMD 15K 1206 0,25W 1%	8894-393012150	R78,R79,R80,R89,R90,R91,R92,R97,R98	VITROHM
106	1	RESISTOR SMD 75K0 1206 0,25W 1%	8912-393012750	R110	VITROHM
108	2	RESISTOR SMD 47K 1206 0,25W 1%	8907-393012470	R66,R77	VITROHM
110	1	SOCKET FOR IC PROF. DIL 32	7244-385914232		
112	1	SHORT CIRCUIT JUMPER CAB4 R=2.54	8082-389210235		FISCHER
114	0.10	SQUARE-PIN SINGLE ROW 36-P M2.54 SL11/112G36	4657-373908151		FISCHER
116	0,35	SQUARE-PIN DOUBLE ROW 2X36P F 2.54 BL 6	4660-373908154		FISCHER
118	2	CONNECTOR HEADER 10-POL(M) 281271-1	4745-373908264	K3,K4	AMP
120	1	CONNECTOR HEADER 14-POL(M) 281272-1	4770-373908329	K1	AMP
122	1	CONNECTOR HEADER 26-POL(M) 281275-1	4736-373908255	K2	AMP
124	1	CONNECTOR 4P M PCB TYCO 829154-4	4774-373908342		AMP

Connector K7 (10-p F): (pin assignments)		Connector K3 (10-p M): (pin assignments)		Connector K1 (14-p M): (pin assignments)			
Pin:	Dir.:	Function:	Remark:	Pin:	Dir.:	Function:	Remark:
1	→	LED1	Signalisation	1	→	U3_S	Measurement
2	→	LED2	Signalisation	2	→	I4_S	Measurement
3	→	LED3	Signalisation	3	→	I3_S	Measurement
4	→	LED4	Signalisation	4	→	I2_S	Measurement
5	→	LED5	Signalisation	5	→	U2_S	Measurement
6	→	LED6	Signalisation	6	→	I4r_S	Measurement
7	→	RST	Reset	7	→	I1_S	Measurement
8	→	OV	OV Gnd	8	→	OV	OV Gnd
Contact 8 is free!				9	→	U28_SB	Measurement
				10	→	MK4200	Measurement
Connector K5 (4-p M): (pin assignments)		Connector K4 (10-p M): (pin assignments)		Connector K2 (26-p M): (pin assignments)			
Pin:	Dir.:	Function:	Remark:	Pin:	Dir.:	Function:	Remark:
1	→	Ucc	+5V	1,3,5,7,9	→	OV	OV Gnd
2	→	SCL	I2C bus	2	→	Udd	Analog out.
3	→	SDA	I2C bus	4	→	Uphase	Analog out.
4	→	OV	OV Gnd	6	→	Pin	Measurement
				10,11	→	CPA	Command
				12	→	Iqpa_s	Measurement
				14	→	U28_sa	Signalisation
				15,16	→	U28	Mess.+supply
				21	→	U2	Measurement
				22	→	U3	Measurement
				23	→	U4	Measurement
				24	→	U5	Measurement
				25	→	U6	Measurement
				26	→	U7	Measurement
				Contacts 8, 13, 17, 18, 19, 20 are free!			

Legend:
 → to PCB
 → out of PCB

1.	Rev.	7.4.04	M.K.	Desby	4.IV.2003	Z.J.	None	None	80355 2030	Lat	1/1
Pos.	Modification	Date	Names	Date	Names						

Pin Assignments of PCB MCU-PAM V3.0

4.2 MCU-PAM II V V3.0

1. Description	2
2. Electrical diagram for MCU-PAM Inputs for RF metering	3
3. PCB for PAM Led Power M. V3.0	4
4. Pin Assignment of PCB MCU-PAM LED – RF metering	5
5. Bill of material for PCB MCU-PAM II V V3.0	6

1. Description

PAM LED & POWER METERING MODULE

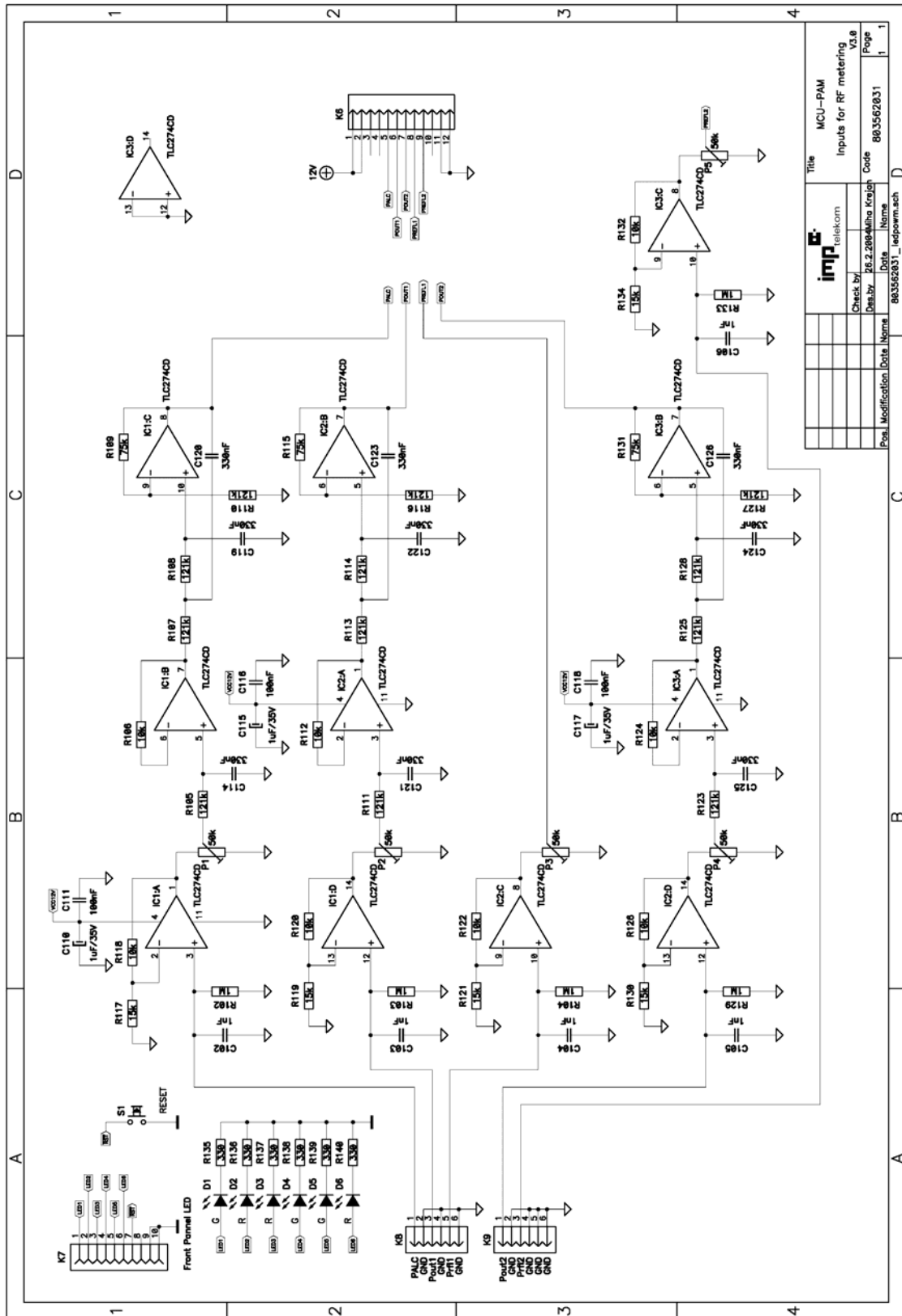
Electrical Diagram (803562031)

Signal LED diodes (D1 – D7) that are connected to MCU-PAM through K7 have the following meanings:

- D1 – PAM module operation
- D2 – Fault
- D3 – Input power present
- D4 – Output power > 3dB
- D5 – Reflected power

Power metering module has buffer IC2:C and IC3:C for reflection power analog voltage coming from detector connected to K8 pin 5-6 and K9 pin 3-4. Reflection measurement is calibrated with P3 and P5. Signals from detectors (K8 pin 1-2, K8 pin3-4 and K9 pin1-2) for output power metering (Palc, Pout1 and Pout2) are feed to low pass filters (IC1, IC2:A, IC2:B, IC2:D, IC3:A, IC3:B). Palc, Pout1 and Pout2 power measurements are calibrated with P1, P2 and P4. Buffered and filtered signals are connected to MCU-PAM through connector K6.

2. Electrical diagram for MCU-PAM Inputs for RF metering



PCB PAM LED POWER M. V3.0
80356 2031

4. Pin Assignments of PCB MCU-PAM LED – RF metering

	1	2	3	4																																				
A																																								
B	Connector K6 (12-p F): (pin assignments) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pin:</th> <th>Dir.:</th> <th>Function:</th> <th>Remark:</th> </tr> </thead> <tbody> <tr> <td>1,2</td> <td style="text-align: center;">←</td> <td>+12V</td> <td>Power Supply</td> </tr> <tr> <td>5</td> <td style="text-align: center;">→</td> <td>Palc</td> <td>Measurement</td> </tr> <tr> <td>6</td> <td style="text-align: center;">→</td> <td>Pout1</td> <td>Measurement</td> </tr> <tr> <td>7</td> <td style="text-align: center;">→</td> <td>Pout2</td> <td>Measurement</td> </tr> <tr> <td>8</td> <td style="text-align: center;">→</td> <td>Pref1</td> <td>Measurement</td> </tr> <tr> <td>9</td> <td style="text-align: center;">→</td> <td>Pref2</td> <td>Measurement</td> </tr> <tr> <td>11,12</td> <td style="text-align: center;">←</td> <td style="text-align: center;">⊥</td> <td>OV Gnd</td> </tr> </tbody> </table> Contacts: 3, 4, 10 are free!				Pin:	Dir.:	Function:	Remark:	1,2	←	+12V	Power Supply	5	→	Palc	Measurement	6	→	Pout1	Measurement	7	→	Pout2	Measurement	8	→	Pref1	Measurement	9	→	Pref2	Measurement	11,12	←	⊥	OV Gnd				
Pin:	Dir.:	Function:	Remark:																																					
1,2	←	+12V	Power Supply																																					
5	→	Palc	Measurement																																					
6	→	Pout1	Measurement																																					
7	→	Pout2	Measurement																																					
8	→	Pref1	Measurement																																					
9	→	Pref2	Measurement																																					
11,12	←	⊥	OV Gnd																																					
C	Connector K8 (6-p M): (pin assignments) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pin:</th> <th>Dir.:</th> <th>Function:</th> <th>Remark:</th> </tr> </thead> <tbody> <tr> <td>1</td> <td style="text-align: center;">←</td> <td>Palc</td> <td>Measurement</td> </tr> <tr> <td>3</td> <td style="text-align: center;">←</td> <td>Pout1</td> <td>Measurement</td> </tr> <tr> <td>5</td> <td style="text-align: center;">←</td> <td>Pref1</td> <td>Measurement</td> </tr> <tr> <td>2,4,6</td> <td style="text-align: center;">←</td> <td style="text-align: center;">⊥</td> <td>OV Gnd</td> </tr> </tbody> </table>				Pin:	Dir.:	Function:	Remark:	1	←	Palc	Measurement	3	←	Pout1	Measurement	5	←	Pref1	Measurement	2,4,6	←	⊥	OV Gnd																
Pin:	Dir.:	Function:	Remark:																																					
1	←	Palc	Measurement																																					
3	←	Pout1	Measurement																																					
5	←	Pref1	Measurement																																					
2,4,6	←	⊥	OV Gnd																																					
D	Connector K7 (10-p F): (pin assignments) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pin:</th> <th>Dir.:</th> <th>Function:</th> <th>Remark:</th> </tr> </thead> <tbody> <tr> <td>1</td> <td style="text-align: center;">→</td> <td>LED1</td> <td>Signalisation</td> </tr> <tr> <td>2</td> <td style="text-align: center;">→</td> <td>LED2</td> <td>Signalisation</td> </tr> <tr> <td>3</td> <td style="text-align: center;">→</td> <td>LED3</td> <td>Signalisation</td> </tr> <tr> <td>4</td> <td style="text-align: center;">→</td> <td>LED4</td> <td>Signalisation</td> </tr> <tr> <td>5</td> <td style="text-align: center;">→</td> <td>LED5</td> <td>Signalisation</td> </tr> <tr> <td>6</td> <td style="text-align: center;">→</td> <td>LED6</td> <td>Signalisation</td> </tr> <tr> <td>7</td> <td style="text-align: center;">→</td> <td>RST</td> <td>Reset</td> </tr> <tr> <td>9,10</td> <td style="text-align: center;">←</td> <td style="text-align: center;">⊥</td> <td>OV Gnd</td> </tr> </tbody> </table> Contact 8 is free!				Pin:	Dir.:	Function:	Remark:	1	→	LED1	Signalisation	2	→	LED2	Signalisation	3	→	LED3	Signalisation	4	→	LED4	Signalisation	5	→	LED5	Signalisation	6	→	LED6	Signalisation	7	→	RST	Reset	9,10	←	⊥	OV Gnd
Pin:	Dir.:	Function:	Remark:																																					
1	→	LED1	Signalisation																																					
2	→	LED2	Signalisation																																					
3	→	LED3	Signalisation																																					
4	→	LED4	Signalisation																																					
5	→	LED5	Signalisation																																					
6	→	LED6	Signalisation																																					
7	→	RST	Reset																																					
9,10	←	⊥	OV Gnd																																					
E	 ← to PCB → out of PCB																																							
F	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">  </td> <td colspan="2" style="text-align: center;"> Pin Assignments of PCB MCU-PAM LED - RF Metering </td> </tr> <tr> <td style="width: 20%;">Check by</td> <td style="width: 20%;">3.IV.2003</td> <td style="width: 20%;">M.K.</td> <td style="width: 40%;"></td> </tr> <tr> <td>Des.by</td> <td>4.IV.2003</td> <td>Z.J.</td> <td></td> </tr> <tr> <td>Pos.</td> <td>Modification</td> <td>Date</td> <td>Name</td> </tr> </table> 80356 2031 List 1/1						Pin Assignments of PCB MCU-PAM LED - RF Metering		Check by	3.IV.2003	M.K.		Des.by	4.IV.2003	Z.J.		Pos.	Modification	Date	Name																				
		Pin Assignments of PCB MCU-PAM LED - RF Metering																																						
Check by	3.IV.2003	M.K.																																						
Des.by	4.IV.2003	Z.J.																																						
Pos.	Modification	Date	Name																																					

5. Bill of material for PCB MCU-PAM II V V3.0

Designation:	Stock No.:	Page:	MCU-PAM_V_II_V3.0_ANG	File:	
PCB MCU-PAM V II V3.0	803562031	Datum	2.25.04	Disk:	

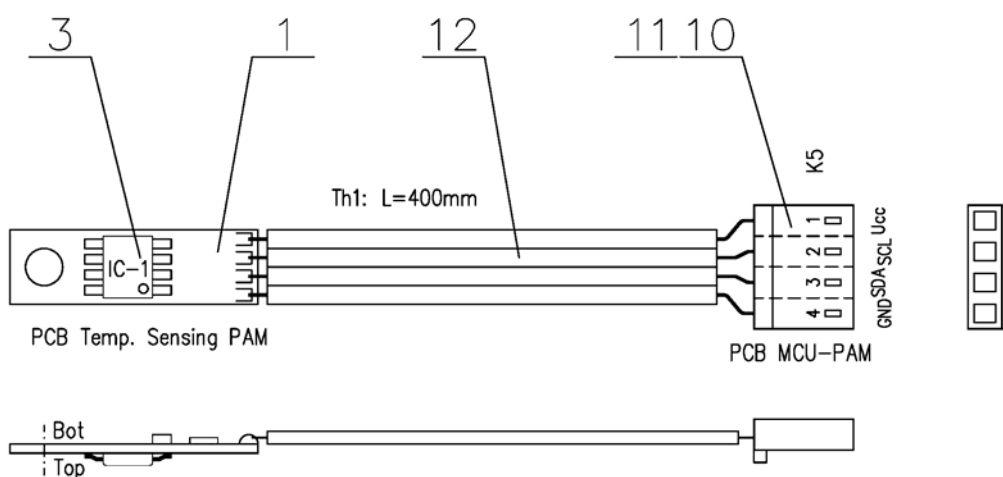
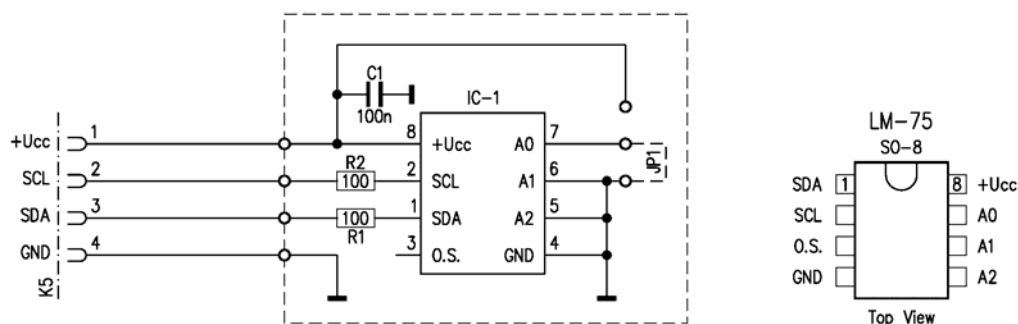
No.	Pcs	Designation	Stock No.	Alt	Signature	Rem./Ven.
1	1	PCB MCU-PAM II V3.0	800552101			IMP
3	3	IC PREC. OP. AMP. TLC 274 CD S0-14	385083274		IC1,IC2,IC3	MAXIM
5	3	DIODE LED GREEN, FI 3MM L-934 GD/B	385255037		D1,D4,D5	KINGBRIGHT
6	3	DIODE LED RED, FI 3MM L-934 HD/B	385255030		D2,D3,D6	KINGBRIGHT
8	5	POTEN. 3296 W-1-503 50 K	388906107		P1,P2,P3,P4,P5	BOURNS
10	3	ELTAN 1UF 35V M SMD B	384650100		C110,C115,C117	KEMET
11	9	CAP. SMD X7R 1206 334 M 25V 330NF	384605331		C114,C119,C120,C121,C122, C123,C124,C125,C126	YAGEO
12	3	CAP. SMD X7R 1206 104 M 63V 100NF	384605101		C111,C116,C118	YAGEO
13	5	CAP. SMD CG 1206 102 J 100V 1NF	384603101		C102,C103,C104,C105,C106	YAGEO
16	5	RESISTOR SMD 1206 1% 0,25W 1 M	392026100		R102,R103,R104,R129,R133	VITROHM
17	12	RESISTOR SMD 1206 1% 0,25W 121 K	392025120		R105,R107,R108,R110,R111, R113,R114,R116,R123,R125, R127,R128	VITROHM
18	3	RESISTOR SMD 1206 1% 0,25W 75 K 0	393012750		R109,R115,R131	VITROHM
20	5	RESISTOR SMD 1206 1% 0,25W 15 K	393012150		R117,R119,R121,R130,R134	VITROHM
21	8	RESISTOR SMD 1206 1% 0,25W 10 K	393012100		R106,R112,R118,R120,R122, R124,R126,R132	VITROHM
24	6	RESISTOR SMD 1206 1% 0,25 W 332 R	392022332		R135 - R140	VITROHM
30	1	BUTTON LPH 1301.9305	312350062		S1	SCHURTER
32	2	CONNECTOR 6-POL M PCB TYCO 829154-6	373908356		K8,K9	AMP
32	2	CONNECTOR 6-POL F PCB TYCO 928205-6	373908357		K8,K9	AMP
32	12	PIN F FOR CONN. TYCO 1-927995-1	373908349		K6,K7	AMP
33	0,35	SQUARE-PIN DOUBLE ROW K0 2X36-P M2.54 SL 4 025 G	373908163			FISCHER

4.3 Temperature sensing PAM V3.0

1. Schema and bill of material Temperature sensing PAM V3.0

2

1. Schema and Bill of material Temperature sensing PAM V3.0



12	Flat Cable 4x0.25mm ²	0.5m	306 601 114	MFK
11	Contact Female TYCO (for Cab. Conn.)	4	373 908 349	AMP
10	Connector 4-pin F TYCO	1	373 908 343	AMP
8	Resistor SMD 1206 1% 100R	2	393 010 100	VTR
6	Capacitor SMD X7R 1206 100nF M 63V	1	384 605 101	YAG
3	IC Temp. Sensor LM-75 (SO-8)	1	385 088 992	NSC
1	PCB Temperature Sensor PAM V3.0	1	80055 2102	IMP
Pos.	Designation	Pcs.	Stock-Nr.	Rmk.

Power Amplifier Module PAM-4/1600

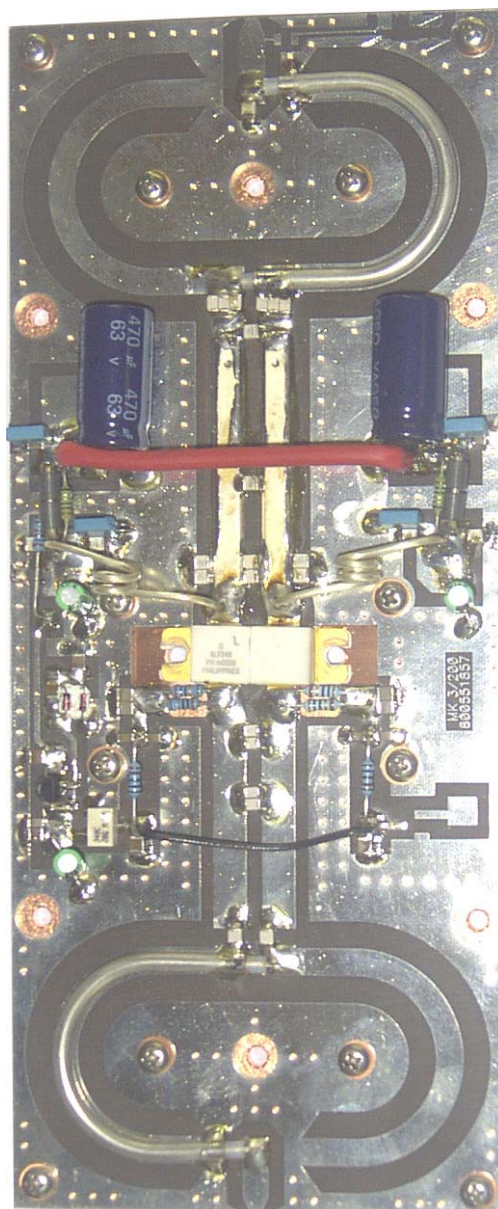
PCB MCU-PAM W

						PCB Temperature Sensing V3.0	
				Check by	31.III.2004	M.K.	
				Des.by	31.III.2004	Z.J.	
Pos.	Modification	Date	Name				80356 2032
							List 1/1

4.4 Power Amplifier NIO-3/200

1. Description	3
2. Electrical diagram	5
3. PCB Power Amplifier NIO-3/200	6
4. Bill of material	7

RF Amplifier module VHF NIO-3/200
RF Ojačevalna kasetna VHF NIO-3/200



1. Description

A200-B124 SOLID STATE AMPLIFIER NIO-3/200

Electric diagram: 80356 1746

Description:

The amplifying cassette *NIO-3/200* is a solid state broadband VHF amplifier class AB. It consists of RF part, with the transistor BLF248 as the basic amplifying element, and of power supply. The transistor BLF248 is a dual push/pull MOSFET transistor manufactured by Phillip&

RF signal is led through the INPUT connection field and applied to the impedance transformer Li, which transforms the symmetrical input line into nonsymmetrical line. Thus, two identical guide lines are obtained through which the signal is led to Gate1 and Gate2 of the transistor BLF248 (push/pull mode of operation). The amplified signal is applied to the impedance transformer L6, which transforms the nonsymmetrical line into symmetrical line. The signal is tapped at the OUTPUT connection field.

The working points are set by potentiometers P1 and P2. The voltage at TP4 and TP5 are set to 3-4V. This current setting is performed during the process of tuning the unit.

DI demodulates the signal, which is led to the TEST OUTPUT connection field. RIO and Ri 1 ensure the appropriate level at the anode of DI and thus at the output.

Adjusting:

The amplifying module is tuned and tested by the manufacturer for all channels in III. Band

Troubleshooting:

In the case of faulty operation check the supply voltages at Gate 1 and Gate2, and Drain 1 and Drain2 of the transistor BLF248. The values of individual voltages are shown in electric diagram. Although voltages have been set correctly, faulty operation may occur as the result of out-of-tune tuning circuits. In such case, it is necessary to measure input and output matching values and gain. When replacing the cassette, it is necessary to coat the interfacial surface between the transistor BLF248 and the cooling element with the thermal compound. **IMPORTANT:** The transistor BLF248 must first be mechanically fixed to the base and soldered afterwards. Whenever the transistor has been replaced, the cassette should be tuned again. Faulty cassettes should be repaired by the manufacturer.

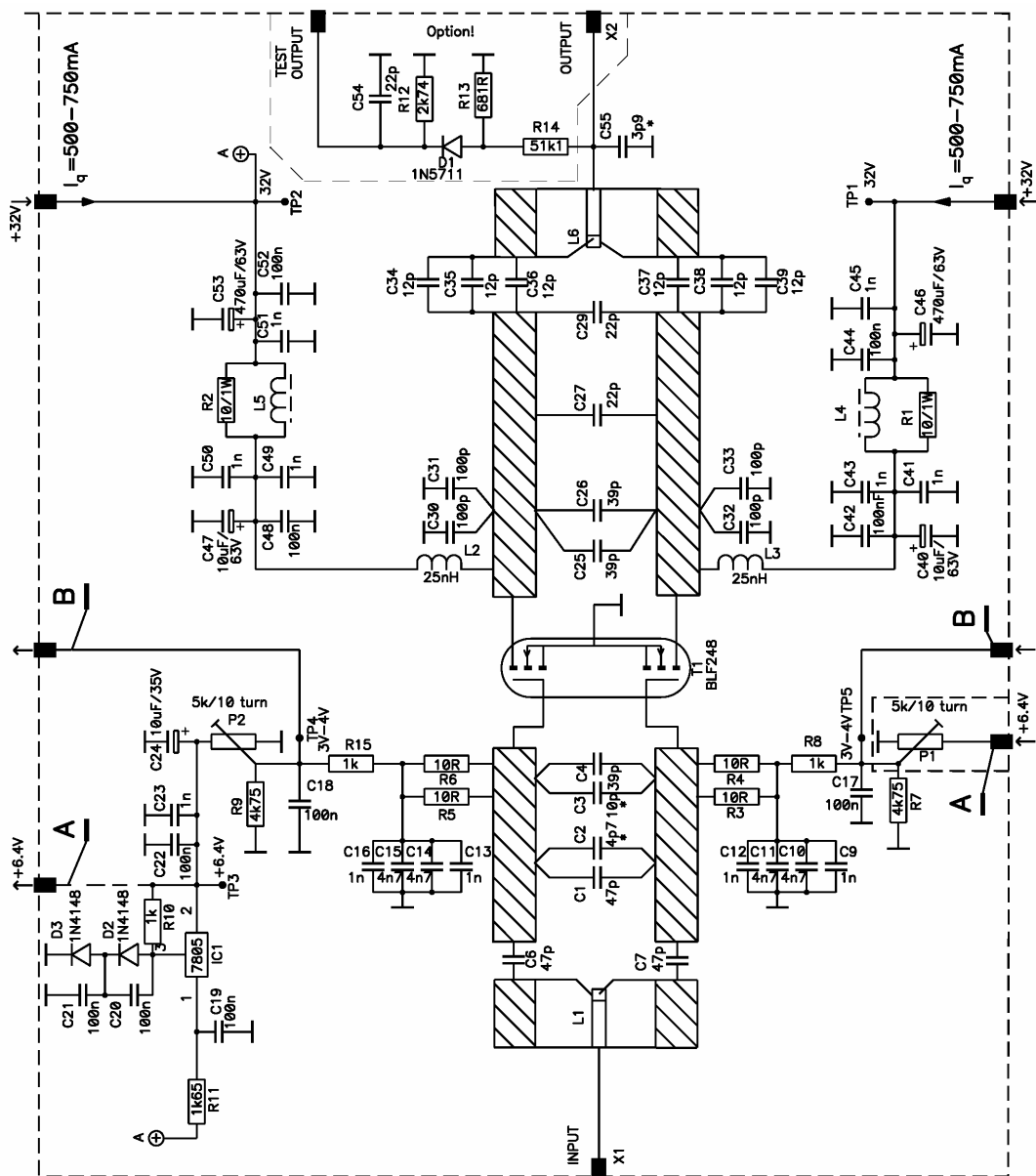
Maintenance:

No maintenance is required.

Technical data:

Frequency range	174MHz ÷ 230MHz
Gain	12dB ± 0,5dB
Output power	200W synh.
Input – output impedance	50 ohm
Input matching	5dB ÷ 10dB
Output matching	>18dB
Supply voltage	+32V
Current consumption	8 - 9A
BIAS current	2 x 250mA ÷ 450mA

2. Electrical diagram



NIO-3/200 $\triangleleft$ 1kW (with P1, P2)

NIO-3/200 $\triangleleft$ 1kW (with P2)

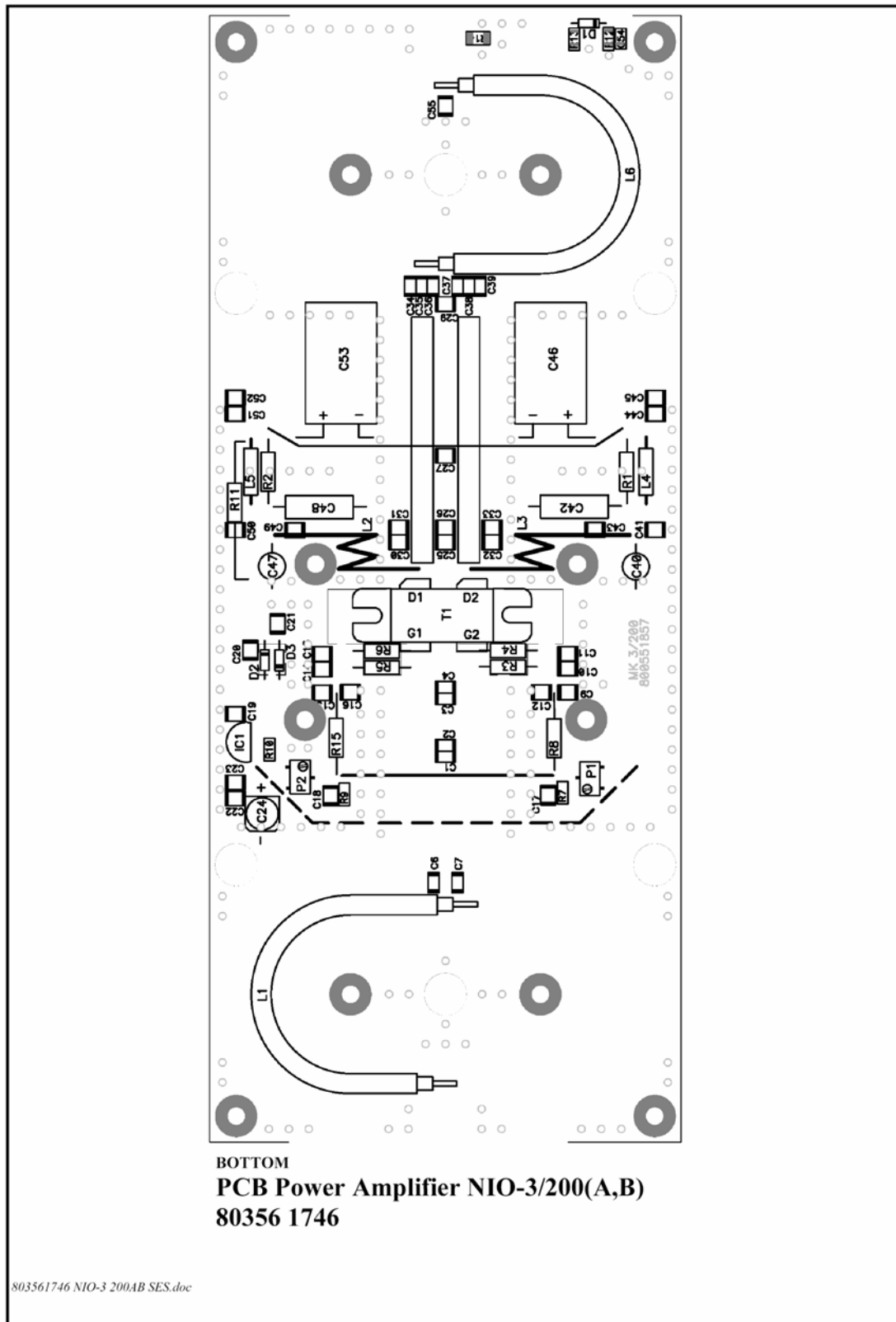
* Final value determined at calibration!

* Natane vrednosti se določijo pri končnih meritvah in so odvisne od kanala!

Date: 20.05.1999

803561746 NIO3-200.SCH

3. PCB Power Amplifier NIO-3/200



4. Bill of material

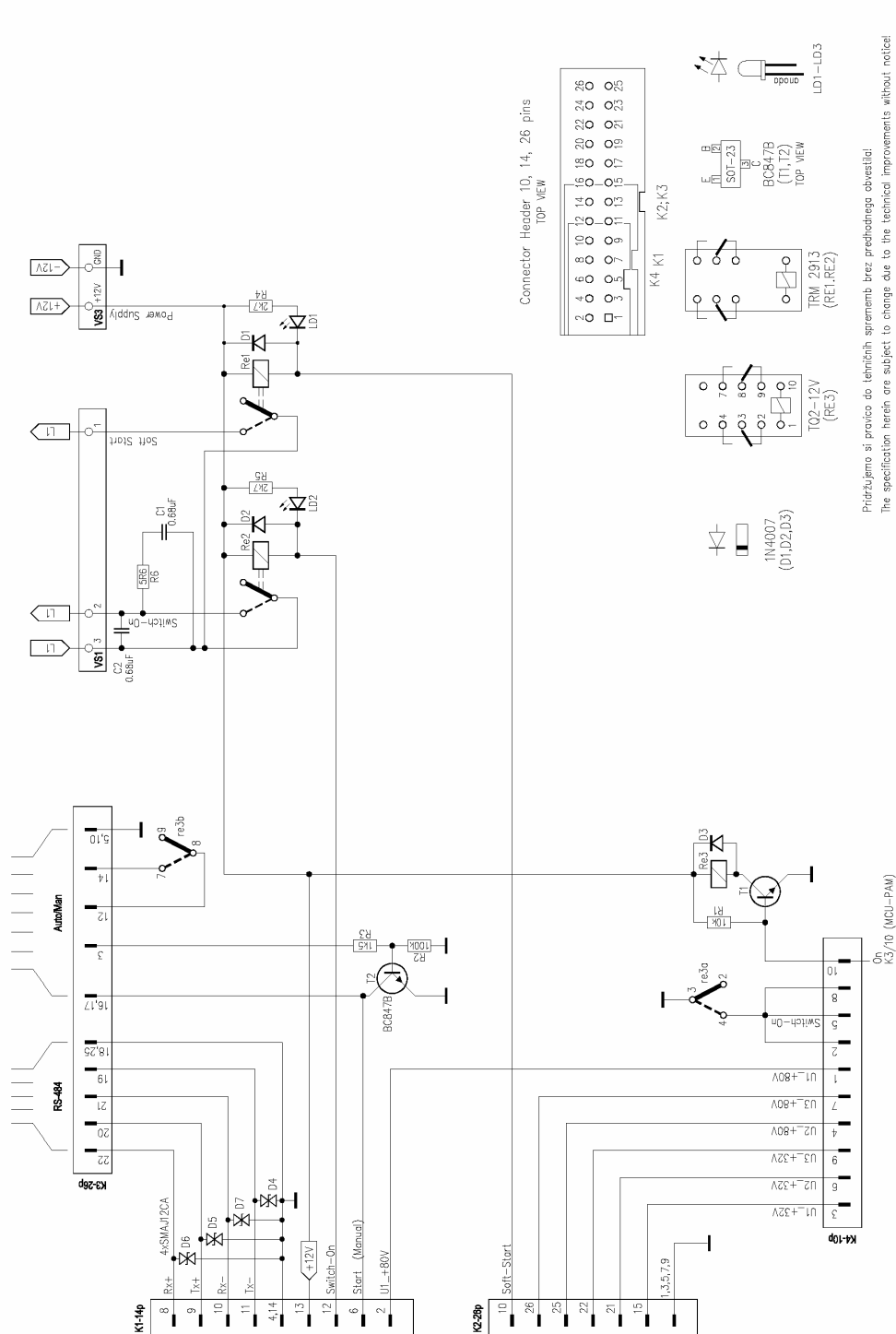
	Designation:	Stock No.:	Page:	TNIO3200 A	File:	
	PCB AMPLIFIER CASSETTE NIO-3/200 (A, B)	803561746	Date:	26.09.2002	Disk:	

No.	Pcs.	Designation:	Stock No.:	Alt	Note	Rem / Ven
1	1	PCB AMPLIFIER CASSETTE MK3/200	800551857			IMP
2	4	CAPACITOR CHIP 100B-101-JP-500 100PF	384336100		C30,C31,C32,C33	ATC
3	3	CAPACITOR CHIP 100B-390-JP-500 39PF	384335139		C4,C25,C26	ATC
4	6	CAPACITOR CHIP 100B-120-JP-500 12PF	384336103		C34,C35,C36,C37, C38,C39	ATC
5	1	CAPACITOR CHIP 100B-3R9-CP-500 3P9	384336105		C55	ATC
6	1	CAPACITOR CHIP 100B-4R7-CP-500 4P7	384336111		C2	ATC
7	1	CAPACITOR CHIP 100B-100-JP-500 10PF	384335110		C3	ATC
8	3	CAPACITOR CHIP 100B-470-JP-500 47PF	384335147		C1,C6,C7	ATC
9	4	CAPACITOR CHIP 100B-102-KP-50 1NF	384337100		C41,C43,C49,C50	ATC
10	2	CAPACITOR CHIP 100B-220-JP-500 22PF	384335122		C27,C29	ATC
11	7	CAPACITOR SMD CG 1206 K 50V 1NF	384602999		C9,C12,C13,C16, C23,C45,C51	ATC
12	6	CAP. SMD X7R 1210 AVX 12101C104KAT2A 100V 100NF	384605102		C17,C18,C19,C20, C21,C22	ATC
13	4	CAPACITOR PLASTIC 2,5X7,5 RD 63V K 100NF	383925100		C42,C44,C48,C52	ISKRA
14	2	CAPACITOR ELKO 12X30 RD 63V M 470UF	383404004		C46,C53	ROEDERSTEIN
15	3	CAPACITOR ELKO 5X12 RD 63V M 10UF	383400071		C24,C40,C47	ROEDERSTEIN
17	4	CAPACITOR SMD CG 1210 M 50V 4N7	384610472		C10,C11,C14,C15	YAGEO
19	4	RESISTOR MFILM MAX 2.7X8MM 1% 10R	391012100		R3,R4,R5,R6	VITROHM
20	2	RESISTOR MFILM MAX 2.7X8MM 1% 1K	391014100		R8,R15	VITROHM
21	2	RESISTOR MOFILM MAX 5X15 2% 10R	391342100		R1,R2	VITROHM
27	2	RESISTOR SMD 1206 1% 0,25W 4K75	393011479		R7,R9	VITROHM
28	1	RESISTOR MFILM MAX 2.7X8MM 1% 1K65	391014165		R11	VITROHM
29	1	RESISTOR SMD 1206 1% 0,25W 1K	393011100		R10	VITROHM
30	2	DIODE 1N 4148	385270148		D2,D3	DIOTEC
33	2	POTENTIOMETER 3269W-1-502 5K	388512251	A	P1,P2	BOURNS
33	1	POTENTIOMETER 3269W-1-502 5K	388512251	B	P2	BOURNS
37	1	VOLTAGE REGULATOR UA 78L05 AWY (TO-92)	385078005		IC1	NSC
38	1	TRANSISTOR BLF 248	385034048		T1	PHILIPS
40	1	COIL L2	800500800		L2	IMP
41	1	COIL L3	800500801		L3	IMP
45	2	CABLE NIO-3/200-1	800570362		L1, L6	IMP
47	2	COIL	801500570		L4,L5	IMP
48	0,1M	WIRE Li7Y TEFLON 900V 0,34MM2 7X0,25	305220035			EN
50	2	PLATE 47X5X1	800310183			IMP
51	1	LINING 3/200	800490674			IMP
62	2	CONNECTOR 23 SMA 50 0 44	373905123		K1,K2	SUHNER

4.5 Relay-KSMC V2.0

1. Electrical diagram for Relay-KSMC V2.0	2
2. PCB for Relay-KSMC V2.0	3
3. Pin Assignments of PCB Relay-KSMC	4
4. Bill of material for PCB Relay-KSMC V2.0	5

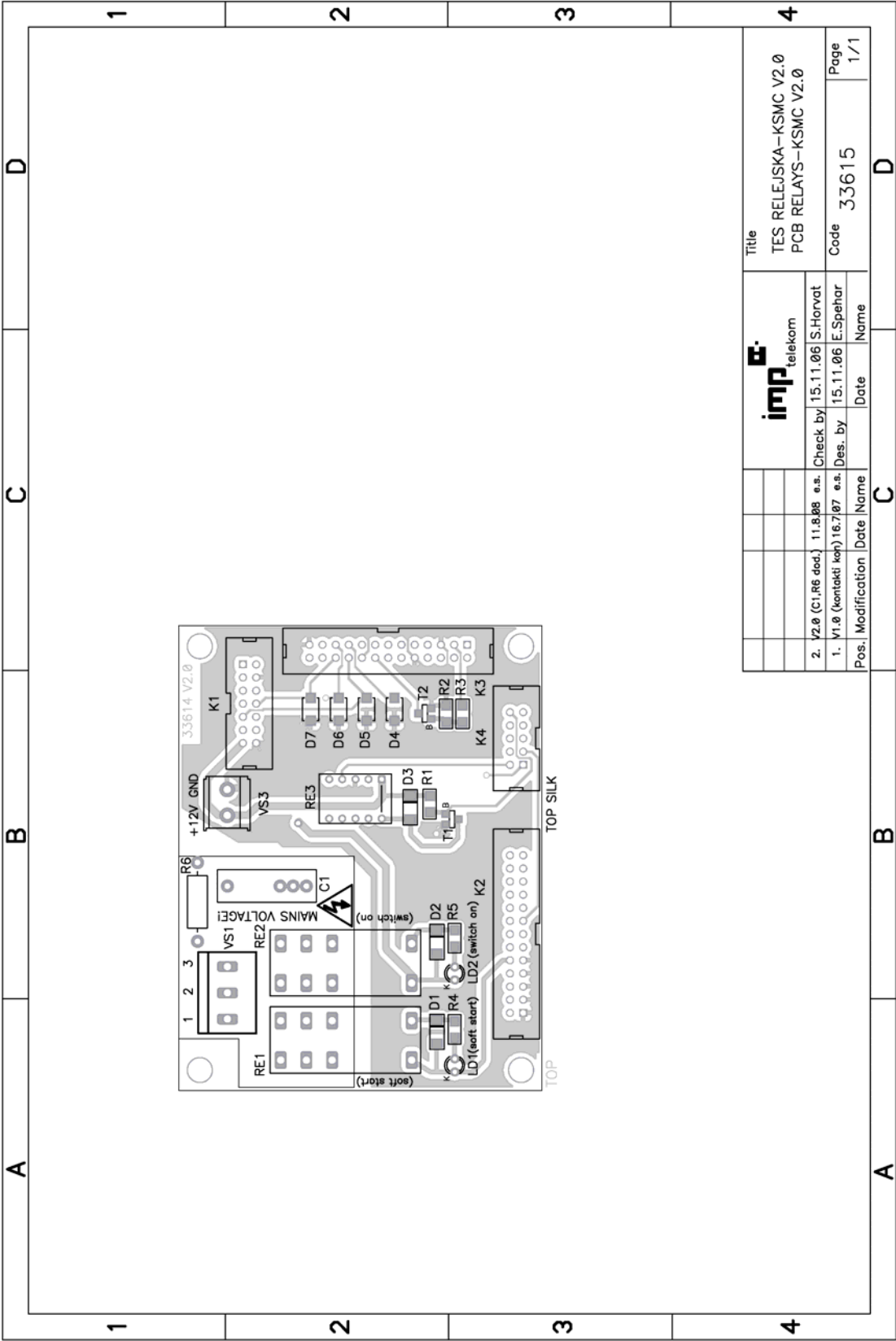
1. Electrical diagram for Relay-KSMC V2.0



Pridržujemo si pravico do tehničnih sprememb brez predhodnega obvestila!
The specification herein are subject to change due to the technical improvements without notice!

[illegible]

2. PCB for Relay – KSMC V2.0



3. Pin Assignments of PCB Relay-KSMC

Connector K3 (10-p M): (pin assignments)

Pin:	Dir.:	Function:	Remark:
3	←	Switch	Command
5,10 18,25	⊥		OV Gnd
12	←	Interlock	Signal
14	←	Interlock	Signal
16,17	→	Auto	Command
19	←	Tx -	RS-485
20	←	Tx +	RS-485
21	→	Rx-	RS-485
22	→	Rx+	RS-485

Contacts: 1,2,4,6,7,8,9,11,13,15,23,24,26 are free!

Connector K1 (14-p M): (pin assignments)

Pin:	Dir.:	Function:	Remark:
2	←	U1_+80V	Measurement
6	←	Start (Manual)	Command
8	←	Rx+	RS485
9	→	Tx+	RS485
10	←	Rx-	RS485
11	→	Tx-	RS485
12	→	Switch-On	Command
13	←	+12V	Power Supply
4,14	⊥		OV Gnd

Contacts 1, 3, 5, 7 are free!

Connector K4 (10-p M): (pin assignments)

Pin:	Dir.:	Function:	Remark:
1	←	U1_+80V	Measurement
2	→	Switch-On	Command
3	←	U1_+32V	Measurement
4	←	U2_+80V	Measurement
5	→	Switch-On	Command
6	←	U2_+32V	Measurement
7	←	U3_+80V	Measurement
8	→	Switch-On	Command
9	←	U3_+32V	Measurement
10	→	Interlock	Signal

Connector K2 (26-p M): (pin assignments)

Pin:	Dir.:	Function:	Remark:
1,3,5, 7,9	⊥		OV Gnd
2	→	Ualc	Analog out.
4	→	Uphase	Analog out.
6	←	Pin	Measurement
10	←	Soft start	Command
12	←	Icpa_s	Measurement
14	←	U28_sa	Signalisation
15	←	U1_+32V	Meas.+supply
21	←	U2_+32V	Measurement
22	←	U3_+32V	Measurement
25	←	U2_+80V	Measurement
26	←	U3_+80V	Measurement

Contacts: 2,4,6,8,11,12,13,14,16,17,18,19,20,23,24 are free!

Legend:

to PCB

out of PCB

Check by 3.IV.2007 Š.H.
Des.by 4.IV.2007 Z.J.

Pin Assignments of PCB Relay - KSMC

33615

List
1/1

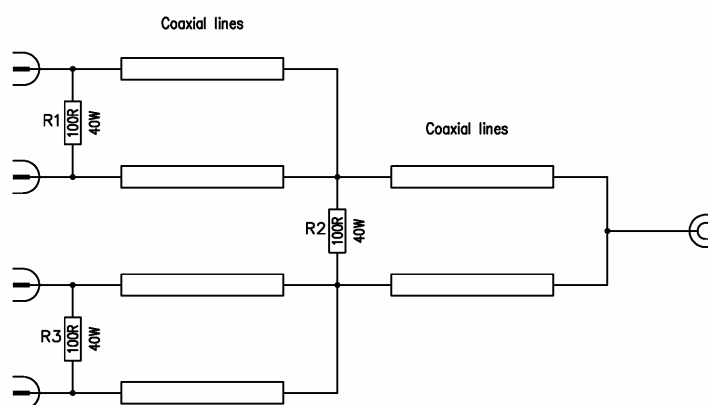
Designation:	Stock No.	Page:		File:	
PCB RELAY-KSMC V2.0	33615	Date:	11.8.2008	Disk:	

5

4.6 Splitter and Combiner 4-way VHF 100W

1. Electrical diagram	2
2. Bill of material	3

1. Electrical diagram



			 TELEKOM	A212—B21		
				Splitter/Combiner		
				100W VHF		
				80261 0175, 80261 0207		Page
Pos.	Modification	Date		Date: 980929	Fin.: BLWLK1	1—

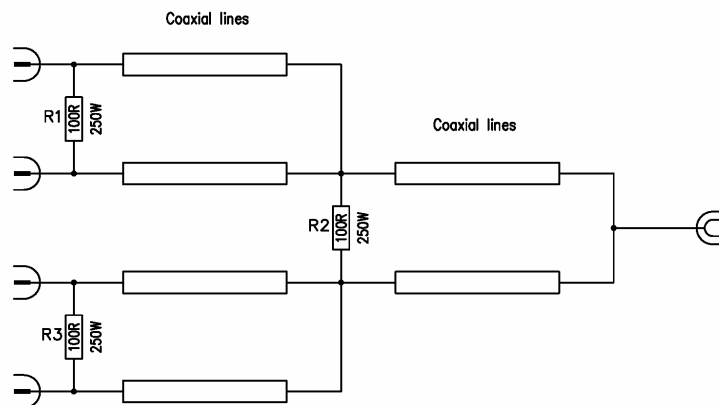
Designation:	Stock No:	Date:	10.7.2012
<i>SPRILLET/COMBINER 4-WAY 100W VHF</i>	24975		

3

4.7 Splitter and Combiner 4-way VHF 1kW

1. Electrical diagram	2
2. Bill of material	3

1. Electrical diagram



			 TELEKOM	A212-B21		
				Splitter/Combiner		
				1kW VHF		
				80261 0174, 80261 0206		Page
				Date: 980713 Fin.: BLWLK1 D.:DD0TV310S2		1-
Pos.	Modification	Date				

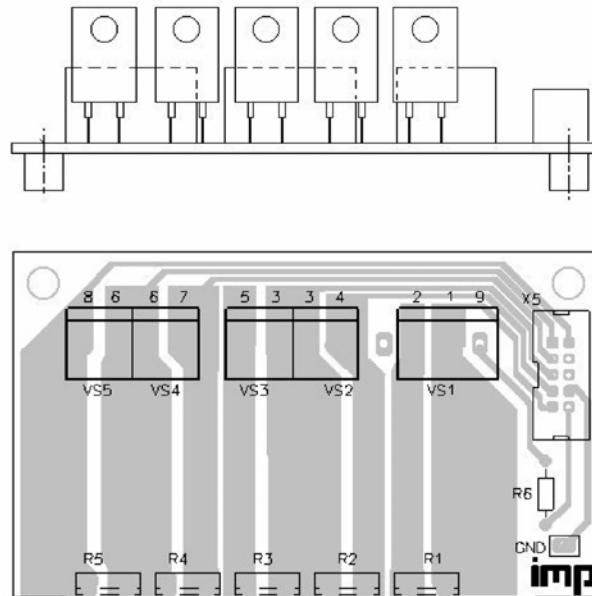
Designation:	Stock No:	Date:	10.7.2012
<i>SPLITTER/COMBINER 4-WAY 1KW VHF</i>	24974		

3

4.8 PCB Resistors 5 PAM

1. PCB Resistors 5 PAM and Description	2
2. Bill of material	3

1. PCB Resistors 5 PAM and Description



TOP

A PCB Resistors 5 PAM is comprised of several 20 miliohm resistors. These resistors are used for measuring currents of an individual amplifying cassetes MK-4/250 (NIO 3/200 for VHF). An R6 resistor is responsible for turning on a driver stage MK-4/250 (NIO 3/10 for VHF). All of these low resistance resistors must be bolted on the heat sink for continous reliable operation. Measured voltages are led through 10 wire flat cable on PCB MCU-PAM.

PCB Resistors 5 PAM
80356 1841

803561841 RESISTORS5 PAMSES ANG.doc

2. Bill of material

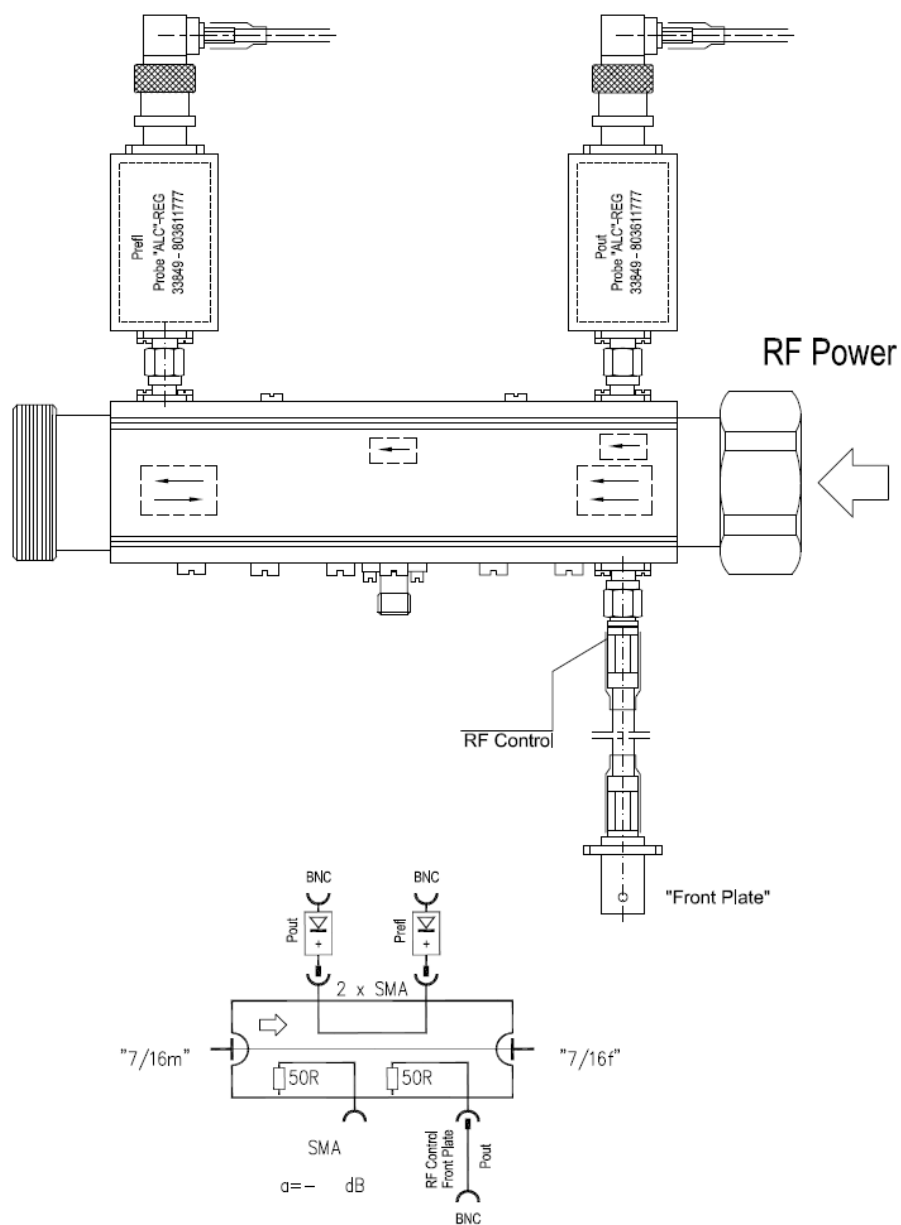
	Designation:	Stock No.	Page:		File:	TU5PAMA
	PCB UPORI 5 PAM	803561841	Date:	10.9.2001	Disk:	PAM-2A
	R1.1-17.10.01 (8)					

No.	Pcs.	Designation	Stock No.	Alt	Signature	Rem./Ven.
1	1	PCB UPORI 5 PAM V.2	800551959			IMP
4	4	ZAKLJ. UPOR 2-P. MKDS 3/2-5.08 1711725	303351102		VS2,VS3,VS4,VS5	PHOENIX
5	1	ZAKLJ. UPOR 3-P. MKDS 3/3-5.08 1711738	303351030		VS1	PHOENIX
6	5	UPOR MP930 30W 5% TO-220 0R02	382480002		R1,R2,R3,R4,R5	CADDOCK
7	1	UPOR MFILM 2,7x8 1% 0,6W 221R	391013221		R6	VTR
8	1	KONEKTOR HEADER 10-PIN. M 281271-1	373908264		X1	SIEMENS

4.9 Measuring line 7/16 - SMA

1. Diagram for measuring line	2
2. Bill of material for measuring line	3
3. Diagram for probe ALC Reg	4
4. Bill of material for probe ALC Reg	5
5. Bill of material for PCB Probe Reg	6

1. Diagram for measuring line



OTVP-x/500K;1000K

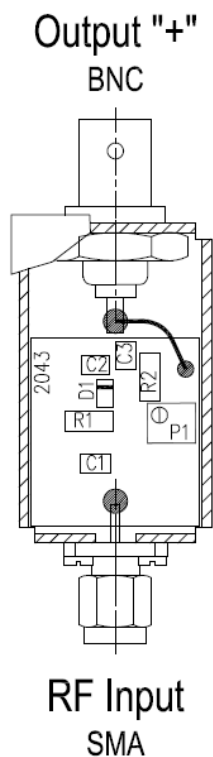
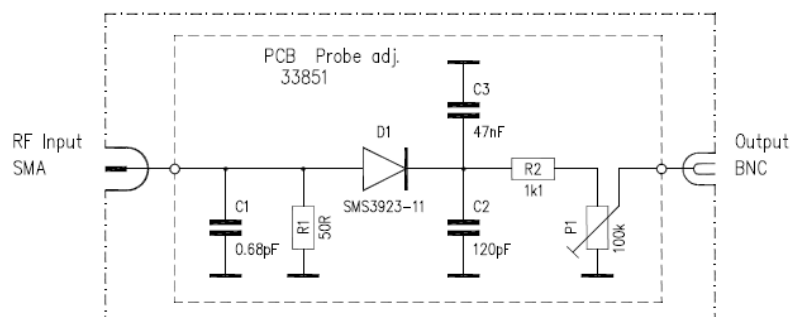
The specification herein are subject to change due to the technical improvements without notice!

				imp telekom		Measuring Line type "7/16" / SMA	
				Name: 3DB COUPLER 7/16 SMA		33859 - 803970052	
Pos.	Modification	Date	Name	Date	2007-02-27	Page 1/1	

Designation:	Stock No:	Date:	3.5.2011
<i>MEASURING LINE ML 7/16 - SMA</i>	33859		

[illegible]

3. Diagram for probe ALC Reg



The specification herein are subject to change due to the technical improvements without notice!

Part of: Probe "ALC" 80361 1777			Surface protection:		Roughness:	Scale: 1 : 1		Weight:		
				Date	Name	Material:				
				Develop.	26.II.2007	Title: RF Probe ALC Reg (PCB: 33851)				
				Constr.	"				Š. Horvat	
				Draw	"				Z.J.	
				Check	"					
2.	dopC1 Op68,Dioda	8.VII.09	Z.J.	 TELEKOM		Code:		33849 – 803611777	Page:	
1.	dop C1 51p	12.6.09	e.s.							
No.	Changes	Date	Name			File: SONDAPN ALC-REG SMA		Disk:		

Designation:	Stock No:	Date:	8.7.2009
<i>PROBE ALC REG</i>	33849		

5

Designation:	Stock No:	Date:	3.5.2011
<i>PCB PROBE REG</i>	33851		

6

4.10 Power Supply

1. Technical data for SWS600L	2
2. Technical data for DSP 30-15	5

1. Technical data for ADA600

TDK-Lambda

SWS600/1000L



SWS600L model shown

Single Output Low Profile Power Supplies

- ◆ Low Cost
- ◆ Low Profile
- ◆ Active Power Factor Correction
- ◆ Universal Input (85 - 265VAC)
- ◆ Input Transient Protected IEC61000-4
- ◆ Low Acoustical noise
- ◆ Medical Certifications (SWS1000L)

RoHS

Key Market Segments & Applications

LED Signs	Test & Measurement
Automated Service	Medical equipment

Features and Benefits

Feature

- ◆ Global safety Approvals
- ◆ Power Factor Corrected
- ◆ Variable speed fan

Benefit

- ◆ Supports Global Use
- ◆ Supports Global Use
- ◆ Greater reliability & lower acoustical noise

Specifications

MODEL		SWS600L	SWS1000L
ITEMS			
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 350VDC	
Inrush Current (115 / 230VAC)	A	20 / 40	
Power Factor	-	Meets EN61000-3-2 Class A	
Input Current (100/200VAC)	A	7.1 / 3.6 (3.3V: 5 / 2.5)	12 / 6
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection	-	>105%, Constant current style	
Overvoltage Protection	V	125% -145%	
Overttemperature Protection	-	Yes, cycle AC or Remote On/Off to reset	
Hold Up Time (Typ)	ms	20ms at 115/230VAC	
Leakage Current (max)	mA	<0.75mA	100µA at 115VAC 60Hz(2)
Remote Sense	-	Yes	
Parallel Connection	-	Yes	
Remote On/Off (CNT)	-	Yes	
Voltage Programming (1)	-	Yes	
DC Good & Fan Fail Signal	-	Yes, open collector output	
Auxiliary Output	-	12V 0.1A	
LED Indicator	-	Green LED = On	
Operating Temperature	-	-40°C start up. -20 to 74°C, derating linearly to 50% load above 50°C	
Storage Temperature	-	-40 to +85°C	
Humidity (non condensing)	-	20 - 90% RH operating, 10 - 95%RH non operating	
Cooling	-	Variable speed internal fan	
Withstand Voltage(One minute)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, Output to CNT 100VAC	Input to Ground 2kVAC, Input to Output 4kVAC, Output to Ground 500VAC, Output to CNT 100VAC
Isolation Resistance	-	>50M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	MIL-STD-810F 514.5 Cat. 4,10	
Shock (in packaging)	-	MIL-STD-810F 516.5 Procedure I, VI	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Certification	-	UL, CSA, EN60950-1, UL60601-1 (1000W only), IEC61010-1 (600W only), EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B	
Weight (Typ)	g	1600	2300
Size (WxHxD)	in	2.4 x 4.72 x 7.48"	2.4 x 5.91 x 9.45"
Warranty	yrs	Three Years	

(1) 1-6V program voltage input to adjust output 20-120% (typical) of nominal. See instruction manual for details & models with this feature.

(2) 300uA worst case, 265VAC 63Hz

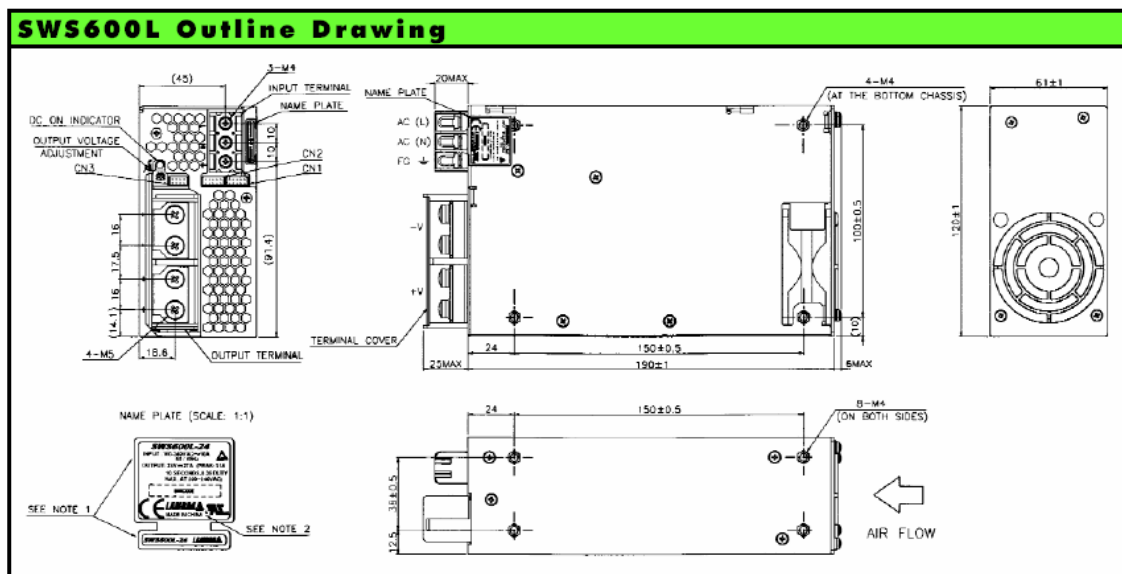
TDK-Lambda

SWS600/1000L

Model Selector								
Model	Voltage	Adjust Range	Max Curr. (A)	Max Pwr (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Eff.(3) (typ)%
SWS600L-3	3.3V	2.64 - 3.96V	120A	396W	30	20	120	70 / 72
SWS1000L-3	3.3V	2.64 - 3.96V	200A	660W	30	20	120	74 / 76
SWS600L-5	5V	4 - 6V	120A	600W	30	20	120	75 / 77
SWS1000L-5	5V	4 - 6V	200A	1000W	30	20	120	79 / 81
SWS600L-12	12V	9.6 - 14.4V	53A	636W	72	48	150	79 / 82
SWS1000L-12	12V	9.6 - 14.4V	88A	1056W	72	48	150	82 / 84
SWS600L-15	15V	12 - 19.5V	43A	645W	90	60	150	79 / 82
SWS1000L-15	15V	12 - 19.5V	70A	1050W	90	60	150	82 / 84
SWS600L-24	24V	19.2 - 28.8V	27A (31A) ⁽⁴⁾	648W(744W)	144	96	150	81 / 84
SWS1000L-24	24V	19.2 - 28.8V	44A (51A) ⁽⁴⁾	1056W(1224W)	144	96	150	84 / 86
SWS600L-36	36V	28.8 - 43.2V	18A	648W	216	144	200	82 / 84
SWS1000L-36	36V	28.8 - 43.2V	29A	1044W	216	144	200	84 / 86
SWS600L-48	48V	38.4 - 56V	13A (15A) ⁽⁴⁾	624W(720W)	288	192	200	82 / 84
SWS1000L-48	48V	38.4 - 56V	22A (25A) ⁽⁴⁾	1056W(1200W)	288	192	200	84 / 86
SWS600L-60	60V	48 - 66V	10A	600W	360	240	200	82 / 84
SWS1000L-60	60V	48 - 66V	17A	1020W	360	240	200	84 / 86

Notes: (3) 115 / 230VAC

(4) Peak current and power possible at 170-26VAC input, 10s max, 35% duty cycle



Other Industrial Products

SWS	50 - 300W Single Output
HWS	15 - 1800W Single output, high reliability
ZWS	5 - 240W pcb style single, output
DLP, DPP, DSP	10 - 480W DIN Rail mount
LS	25 - 200W Single output, low cost

For Additional Information, please visit
us.tdk-lambda.com/lp/products/sws-series.htm

2. Technical data for DSP 30-15

TDK-Lambda

DSP Series

7.5W to 100W Low Profile DIN Rail Mount Power Supplies

Features

- ◆ Low Profile for Building Automation
- ◆ 5V to 24V Outputs
- ◆ Wide Range AC Input
- ◆ UL1310 Class 2⁽¹⁾
- ◆ Class II Double Insulation
- ◆ -25 to +71°C Operation



Key Market Segments & Applications



Specifications		DSP10	DSP30	DSP60	DSP100
Model		DSP10	DSP30	DSP60	DSP100
AC Input Voltage range	VAC	90 - 264VAC, Class II double insulated (No ground connection required)			
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	VDC	120 - 370VDC			
Inrush Current (115 / 230VAC)	A	15 / 30A	25 / 50A	30 / 60A	30 / 60A
Power Factor & Flicker	-	Meets EN61000-3-2, EN61000-3-3			
Output Voltage Accuracy	%	±1% of Nominal			
Line Regulation	%	1%			
Load Regulation	%	1%			
Ripple and Noise (20MHz BW)	mV	50mV			
Overcurrent Protection (Typ)	-	110 - 160%, fold forward under short circuit (DSP100-24/C2 102-108%)			
Overvoltage Protection	V	120 - 145%			
Hold Up Time (115VAC input)	ms	See Model Selector			
LED Indicators	-	Green LED = On, Red LED = DC Output Low			
Operating Temperature	-	-25 to +71°C (Derate linearly 2.5%/°C from 55 to 71°C)			
Temperature Coefficient	%/°C	±0.02%/°C			
Storage Temperature	-	-25 to +85°C			
Operating Humidity	-	20 - 95% RH (non condensing)			
Cooling	-	Convection			
Withstand Voltage	-	Input to Output 3kVAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Input to Output 500VDC			
Vibration (Operating)		IEC 60068-2-6 (Mounting by rail: Random wave, 10-500 Hz, 2G, ea. along X,Y,Z axes 10 min/cycle, 60 min)			
Shock (Operating)		IEC 60068-2-27 (Half sine wave, 4G, 22ms, 3 axes, 6 Faces, 3 times for each face)			
Safety Agency Approvals	-	UL1310 Class 2 ⁽¹⁾ , UL508 Listed, UL60950-1, EN60950-1, CE			
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8 & -11			
Conducted & Radiated EMI	-	DSP10: EN55022 Class B; DSP30-100: EN55022 Class A			
Weight (Typ)	g	60	200	250	320
Size (WxHxD)	in	0.71 x 3.58 x 2.19"	2.09 x 3.58 x 2.19"	2.8 x 3.58 x 2.19"	3.54 x 3.58 x 2.19"
Case material	-	Plastic			
Warranty	yrs	Two years			

(1) See model selector on page 2.

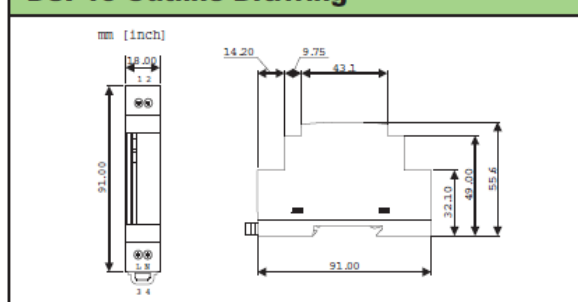
TDK-Lambda

DSP Series

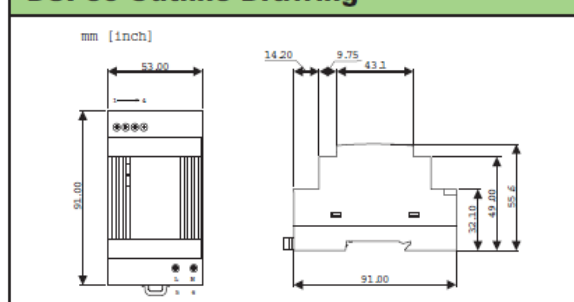
Model Selector

Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Efficiency (Typ %)	Hold Up Time 115VAC in (ms)	UL1310 Class 2
DSP10-5	5	None	1.50	7.5	74	10	Yes
DSP30-5	5	5 - 5.5	3.00	15.0	74	25	Yes
DSP60-5	5	5 - 5.5	7.00	35.0	80	16	-
DSP10-12	12	None	0.83	10.0	78	10	Yes
DSP30-12	12	12 - 14	2.10	25.2	82	25	Yes
DSP60-12	12	12 - 14	4.50	54.0	84	16	Yes
DSP100-12	12	12 - 14	6.00	72.0	82	16	-
DSP10-15	15	None	0.67	10.1	78	60	Yes
DSP30-15	15	13.5 - 16.5	2.00	30.0	83	25	Yes
DSP60-15	15	13.5 - 16.5	4.00	60.0	85	12	Yes
DSP100-15	15	13.5 - 16.5	5.00	75.0	85	16	-
DSP10-24	24	None	0.42	10.1	80	60	Yes
DSP30-24	24	24 - 28	1.30	31.2	83	25	Yes
DSP60-24	24	24 - 28	2.50	60.0	86	12	Yes
DSP100-24/C2	24	20 - 24.2	3.80	91.2	89	10	Yes
DSP100-24	24	24 - 28	4.20	100.8	85	10	-

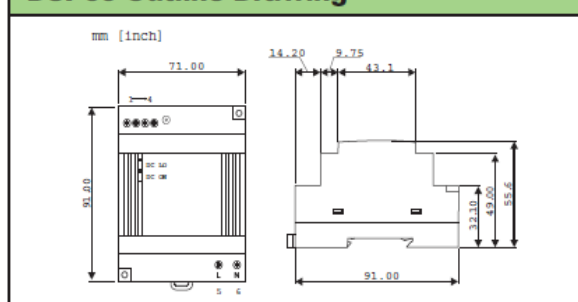
DSP10 Outline Drawing



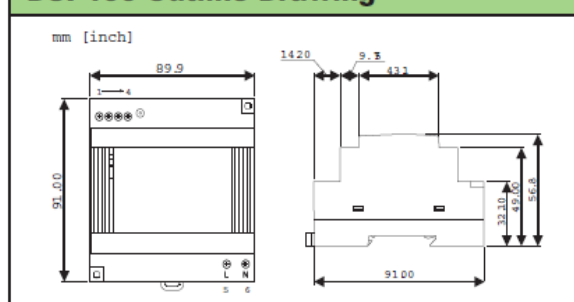
DSP30 Outline Drawing



DSP60 Outline Drawing



DSP100 Outline Drawing



Other DIN Rail Products

DSP/DPP	10W to 480W, 5V to 48V power supplies
DLP	75W to 240W power supplies
DLP-PU	Redundancy Module (20A)
R Series	3A to 30A single & three phase EMI Filters

Snap-on Mounting: snap onto DIN Rail TS35/7.5 or TS35/15.
(no tools required)

For Additional Information, please visit
us.tdk-lambda.com/lp/products/dsp-series.htm



5. Directional coupler, Probe ALC REG, Probe CMB

5.2.1 Probe »ALC« REG

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3. Bill of material Probe »ALC« REG	4
4. Electrical diagram and PCB Probe adjustment	5
5. Bill of material PCB Probe adjustment	6

1. Description

RF PROBE »ALC« REG

Stock No.: 33849-803611777

Stock No.: 42223-803611772

RF Probe ALC Reg is used for power measuring. Power is measured indirectly, through voltage. Probe is provided for mounting on the directional coupler on the output.

It consists of a diode D1 and capacitor C3. Diode D1 directs RF voltage which is charged capacitor C3. The probe gives the peak value of voltage. DC voltage is collected at the resistor divider formed by resistor R2 and potentiometer P1. With potentiometer is corrected frequency slope of measuring directional coupler. Trimmer P1 is factory preset to level **4,68V**.

DC voltage get on the output, led via coaxial cable on the electrical circuit. This circuit process the signal for protection (in case of reflection) or for measuring output power.

The probe is calibrated in factory and no special maintenance is required. In case of damage of diode in probe, it must be changed.

HF input SMA plug

D.C. voltage output BNC jack

2. Assembly Probe

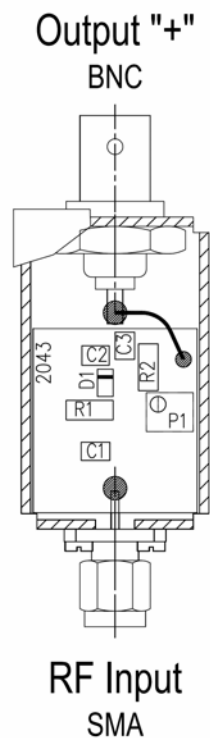
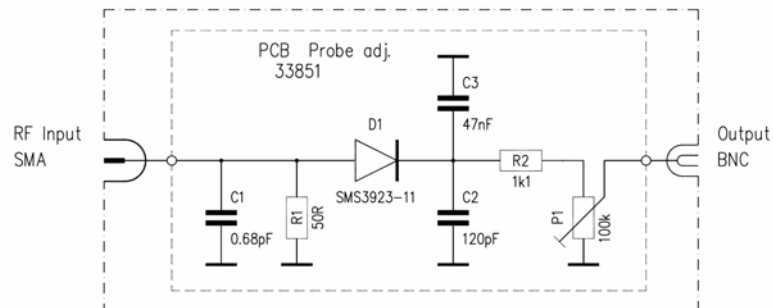


3. Bill of material Probe

	Designation:	Stock No.	Page:		File:	
	PROBE "ALC" REG	33849	Date:	26.2.2007	Disk:	

No.	Pcs	Designation	Stock No.	Signature	Rem./Ven.
1	1	PCB PROBE ADJ.	33851		IMP
2	1	HOUSING FOR PROBE SMA	12604-800130270		IMP
12	1	CONNECTOR BNC-F BN 94 26 00 S	4961-373911107		SUHNER
14	1	CONNECTOR MINI M PANEL 13 SMA 50-0-6	4563-373905112		SUHNER

4. Electrical diagram and PCB Probe adjustment



The specification herein are subject to change due to the technical improvements without notice!

Part of: Probe "ALC" 80361 1777				Surface protection:		Roughness:		Scale: 1 : 1		Weight:		
								Material:				
				Date	Name	Title: RF Probe ALC Reg (PCB: 33851)						
				Develop.	26.II.2007							
				Constr.	"							S. Horvat
				Draw	"							Z.J.
				Check	"							
2.	dopC1 Op68,Dioda	8.VII.09	Z.J.	 TELEKOM		Code:		33849 - 803611777		Page:		
1.	dop C1 51p	12.6.09	e.s.									
No.	Changes	Date	Name									
						File: SONDAPN ALC-REG SMA		Disk:				

	Designation:	Stock No.	Page:		File:	
	PCB PROBE ADJUSTMENT	33851	Date:	12.6.2009	Disk:	

[illegible]

5.2.2 Probe CMB

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5. PCB Probe CMB	6
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1. Description

Vision and sound probe CMB

DESCRIPTION

The probe is designed for the measuring the power levels, vision and two sound carriers levels. The input RF signal level 18 dBm is assured by the directional coupler which is mounted on the output of the transmitter.

Power supply voltage is +12V. The signal is led to the attenuator and is divided into two parts. One part is led via directional coupler CP1 to the mixer MIX1. Output from the mixer is video signal and is amplified by means of operational amplifier IC1:A. Sound carrier 1 (5,5MHz) and sound carrier 2 (5,74MHz) are obtained from the ceramic filters IF2 and IF1. TR2 and TR3 are impedance transformers. Sound carrier2 level is 7dB lower than sound carrier1 and is additionally amplified by means of IC1:B. Amplified signals (by IC2) are led to the detector diodes D4 and D5. DC voltages from the D4 and D5 are proportional the levels of the sound carriers. By means of potentiometers P2 and P3 the output levels are preset.

Vision carrier level is obtained from the diode D1. Diode D2 is for temperature compensation of vision carrier circuitry. The signal is amplified by means of operational amplifier of IC3 and the output level is preset by means of potentiometer P1.

Note:

Measurement of the sound carrier level is correct when the vision carrier is present!

TECHNICAL SPECIFICATIONS

◆ Power Supply	+12V, 30mA
◆ Input RF signal (max)	+22dBm
◆ Input matching	>20dB
◆ Output level	0-8V _{DC}

Maintenance:

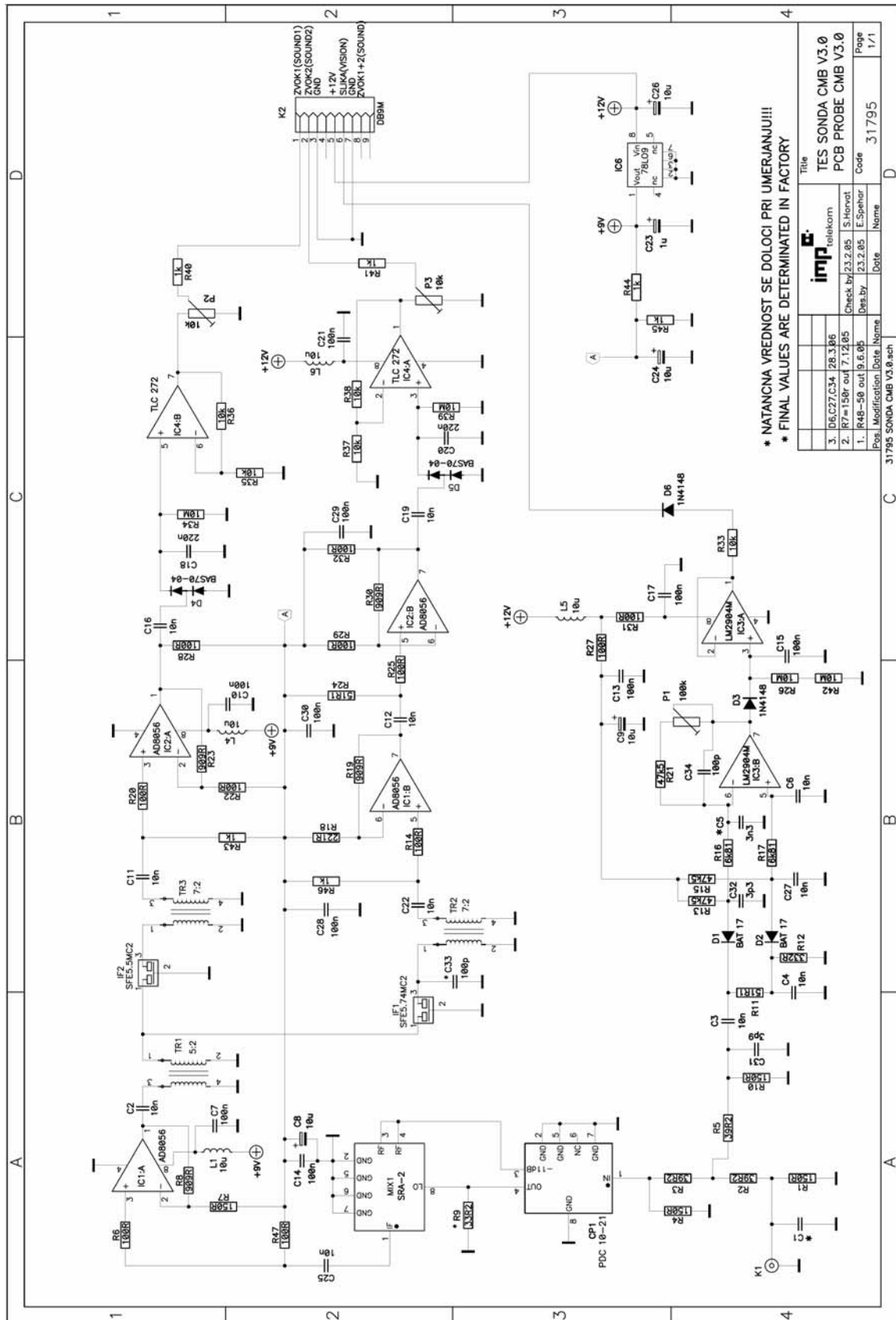
No maintenance is required.

2. Assembly Probe CMB

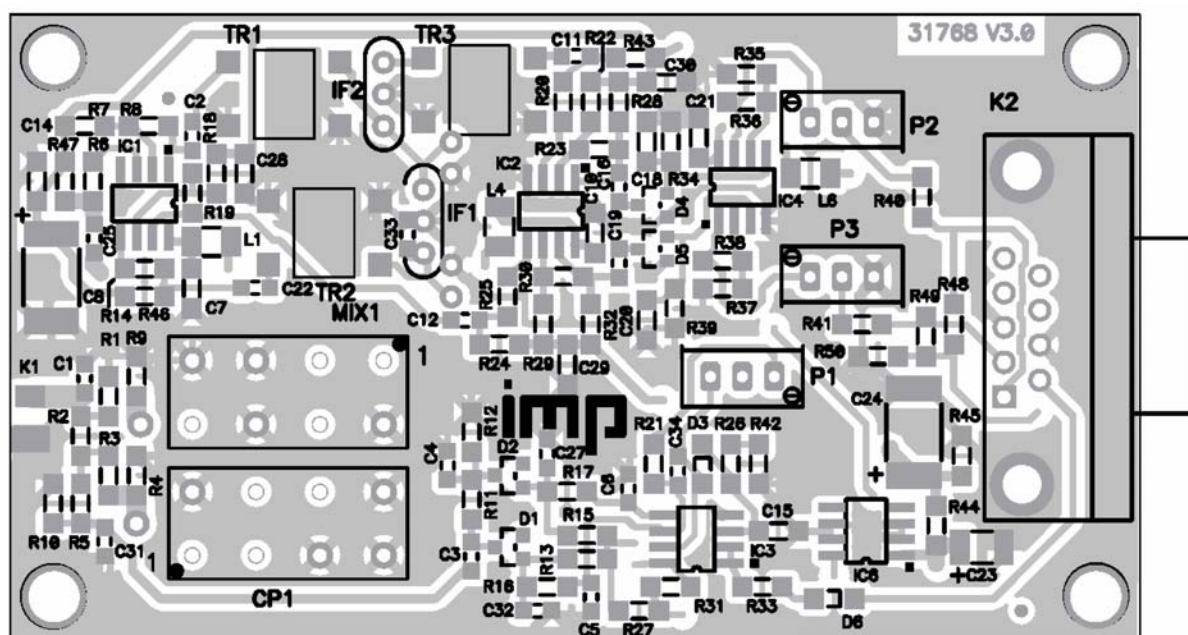


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4. Electrical diagram PCB Probe CMB

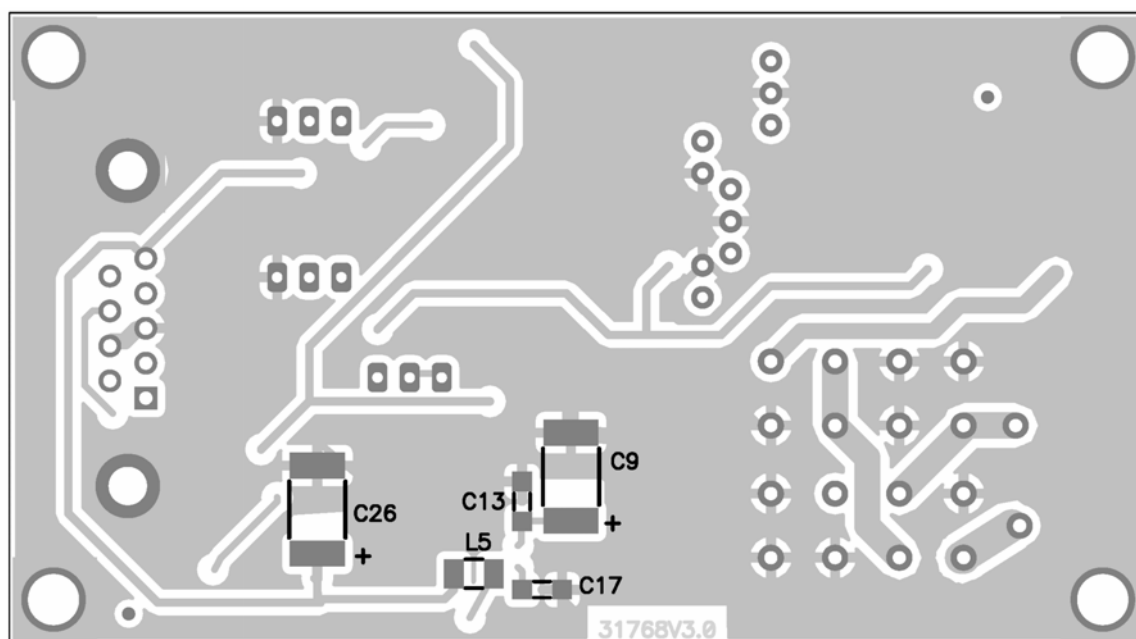


5. PCB Probe CMB



TOP

TOP SILK



BOT.SILK BOTTOM

6. Bill of material PCB Probe CMB

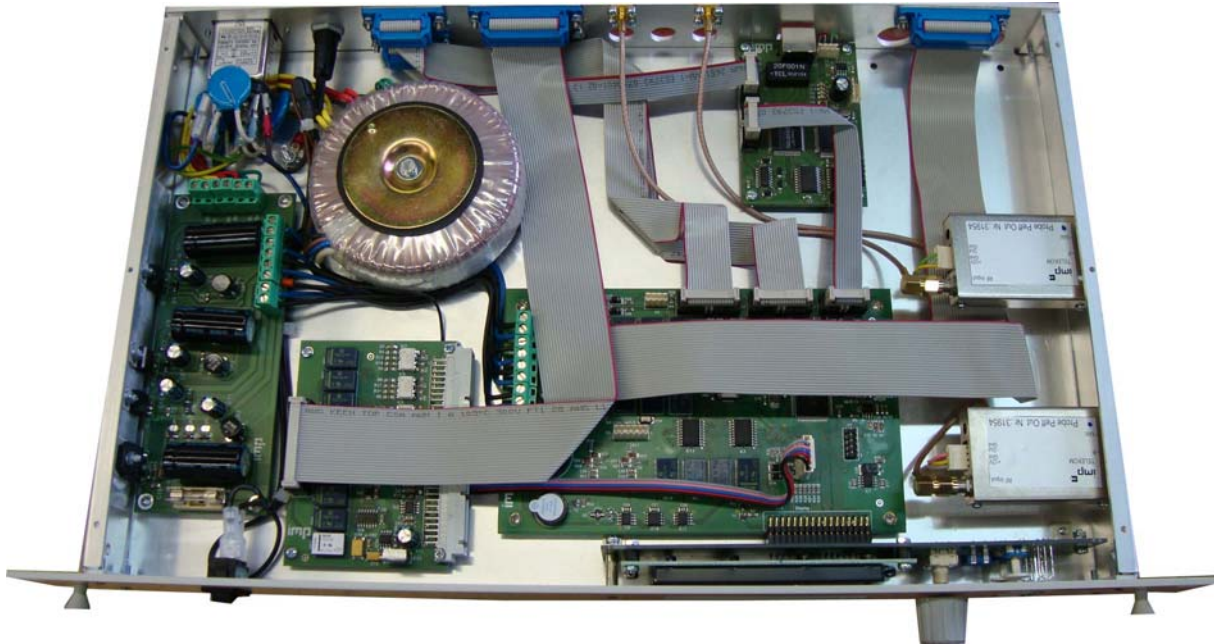
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	PCB PROBE CMB V3.0	31795	Date:	12.2.2008	Disk:	
		31796(STS)				

No.	Pcs	Designation:	Stock No.	Signature	Rem./Ven.
2	1	PCB PROBE CMB V3.0	31768		IMP
4	2	IC AD 8056 AR S08	6914-385095008	IC1,IC2	AD
6	1	IC TLC 272 BCD S08	6666-385083272	IC4	TI
8	1	OP. AMP. DUAL SMD LM 2904 M SO-8	6850-385088904	IC3	NSC
10	1	NAP. REGUL. SMD LM 78L09 ACM SO-8	6599-385078008	IC6	NSC
12	1	RF MIXER DC-1000MHZ SRA-2	31058-385086014	MIX1	MINI CIRCUIT
14	1	DIRECTIONAL COUPLER PDS-10-21	31059-385086017	CP1	MINI CIRCUIT
16	1	FILTER KERAMIC SFE 5,5 MA	7941-389084055	IF2	IMP
18	1	FILTER KERAMIC SFE 5,74 MA	31057-389084057	IF1	IMP
19	2	DIODE SMD BAS70-04 SOT23	7176-385330004	D4,D5	SIEMENS
20	2	DIODE SMD BAT17 SOT23 Q62702-A504	7172-385310017	D1,D2	SIEMENS
21	2	DIODE SMD LL4148 MELF	7167-385290148	D3,D6	PHILIPS
22	2	POT 10K 3296 W-1-103	7857-388906111	P2,P3	BOURNS
23	1	POT 100K 3296 W-1-104	7860-388906114	P1	BOURNS
24	4	CHOCK SMD SIMID 02 10UH B82422-A1	7596-387902010	L1,L4,L5,L6	SIEMENS
26	4	CAP TANSMD 10UF 35V D M	6245-384651010	C8,C9,C24,C26	SIEMENS
27	1	CAP TANSMD 1UF 35V B M	6239-384650100	C23	SIEMENS
28	1	CAP SMD 3,3PF 50V CG 0805 C	6164-384600330	C32	YAGEO
29	1	CAP SMD 3,9PF 50V CG 0805 C	6165-384600390	C31	YAGEO
31	2	CAP SMD 100PF 50V CG 0805 K	6186-384602100	C33,C34	YAGEO
32	1	CAP SMD 3,3NF 50V X7R 0805 M	6209-384603330	C5	YAGEO
34	11	CAP SMD 10NF 50V X7R 0805 K	6212-384604100	C2,C3,C4,C6,C11,C12,C16,C19,C22,C25,C27	YAGEO
36	10	CAP SMD 100NF 63V X7R 1206 M	6220-384605101	C7,C10,C13,C14,C15,C17,C21,C28,C29,C30	YAGEO
38	2	CAP SMD 220NF 50V X7R 1206 M	6223-384605221	C18,C20	YAGEO
42	4	RESISTOR SMD 10M 1206 0,25W 5%	8943-393015100	R26,R34,R39,R42	VITROHM
44	3	RESISTOR SMD 47K5 1206 0,25W 1%	8765-392024475	R13,R15,R21	VITROHM
46	5	RESISTOR SMD 10K 1206 0,25W 1%	8889-393012100	R33,R35,R36,R37,R38	VITROHM
48	2	RESISTOR SMD 6K81 1206 0,25W 1%	8883-393011680	R16,R17	VITROHM
50	6	RESISTOR SMD 1K 1206 0,25W 1%	8856-393011100	R40,R41,R43,R44,R45,R46	VITROHM
54	4	RESISTOR SMD 909R 1206 0,25W 1%	8855-393010909	R8,R19,R23,R30	VITROHM
56	1	RESISTOR SMD 332R 1206 0,25W 1%	8710-392022332	R12	VITROHM
58	1	RESISTOR SMD 221R 1206 0,25W 1%	8839-393010220	R18	VITROHM
60	4	RESISTOR SMD 150R 1206 0,25W 1%	8953-393201500	R1,R4,R7,R10	VITROHM
62	11	RESISTOR SMD 100R 120R 1206 0,25W 1%	8833-393010100	R6,R14,R20,R22,R25,R27,R28,R29,R31,R32,	VITROHM

				R47	
64	2	RESISTOR SMD 51R1 1206 0,25W 1%	8691-392021511	R11,R24	VITROHM
66	3	RESISTOR SMD 39R2 1206 0,25W 1%	8688-392021392	R2,R3,R5	VITROHM
68	1	RESISTOR SMD 33R2 1206 0,25W 1%	8827-393010033	R9	VITROHM
76	1	TRAFO TR-DDS	31456-801520267	TR1	IMP
78	2	TRAFO TR-CMB	31845	TR2,TR3	IMP
80	1	CONNECTOR D-SUB 9-P(M) PCB D-9P-LP	4622-373908007	K2	ERNI

6. Change-over Automatic PAP-D

1. User Manual
2. Electrical diagram
3. Assembly
4. Bill of material



POGLED SPREDAJ
FRONT VIEW



POGLED ZADAJ
REAR VIEW



Panel Preklopna avtomatika PAP-D V1.1
Panel Change over PAP-D V1.1
 42623

OPERATING MANUAL

Automatic changeover unit

PAP-D

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1.Safety precautions

IMP TELEKOM company equipment (PAP-D) has been designed and manufactured into due consideration the personnel Safety requirements as specified by IEC 215 Standard and Safety at Work Law (Slovenian Official Paper Nr.47/88).

The installation, operation, maintenance and service of this equipment involves risks both to personnel and equipment, and must be performed only by qualified personnel exercising due care. IMP TELEKOM shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks.

The following are general safety precautions that are not related to any specific procedure and therefore do not appear elsewhere in this manual. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

PERSONNEL MUST AT ALL TIMES OBSERVE SAFETY WARNINGS, INSTRUCTIONS AND REGULATIONS!

ALWAYS DISCONNECT POWER BEFORE OPENING COVERS, DOORS, ENCLOSURES, PANELS OR SHIELDS AND DISCHARGE AND GROUND A CIRCUIT BEFORE TOUCHING IT

KEEP AWAY FROM LIVE CIRCUIT

DO NOT ADJUST OR SERVICE ALONE

IN CASE OF EMERGENCY ENSURE THAT POWER HAS BEEN DISCONNECTED

ELECTRIC SHOCK

Factors affecting electric shock consequence are:

- amount of current flown through human body
- current path through human body
- contact duration

Rescue:

In case of electric shock, turn off the high voltage at once and ground circuits. If the high voltage cannot be turned off without delay, free the victim from the contact with the live conductor as promptly as possible. Avoid direct contact with either the live conductor or the victim's body. An axe with a dry wooden handle may be used to cut the high voltage wire. Use extreme caution to avoid the resulting electric flash.

Resuscitation:

Personnel working with or near high voltage should be familiar with modern methods of resuscitation.

NON - IONISING RADIATION MICROWAVE AND RADIO FREQUENCY

In normal operation in accordance with the instructions provided in the service manual, no hazard will exist if the equipment and its accessories have been installed correctly and are functioning properly.

Ensure all input and output RF connections, flanges and couplings are leak proof and correctly installed

2. Automatic changeover unit PAP-D

Automatic changeover unit PAP-D is capable of controlling DVB-T transmitters and transposers. It can feature internal RF switch (optional) and it can also control external high power coaxial relay. In case of breakdown of primary device it switches to secondary device to ensure continuity of service. This unit is 100% microprocessor controlled and it allows the software operated configuration of operating parameters, such as low power threshold, delays and switching time. It features real time clock and stores up to 999 events during operation. Standard character display allows checking and changing parameters. Optional Web and SNMP control is available. This unit maintains state of ASI distribution in case of power loss or unit breakdown, which grants signal continuity in such cases.

Advanced solutions and benefits:

- 100% microprocessor controlled
- Internal coaxial relay (optional)
- Fully bistable circuitry
- Universal interface

Weight: 3,6 kg

Dimensions:	height:	44 mm (1 RU)
	width:	483 mm (19")
	depth:	270 mm

2.1 Interface

2.1.1 Front side view

Front side contains On/Off switch. This unit is controlled by encoder and quick selection buttons. All settings can be monitored on standard character 2x20 display and LED diodes. Front side is shown on figure 1

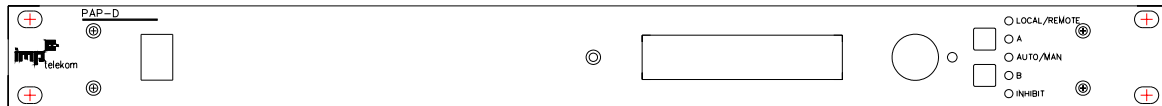


figure 1

2.1.2 Back view

On the back side this unit includes standard D-Sub connectors, internal coaxial relay contacts, power connector with fuse, 3 BNC connectors for distribution of ASI signal and 2 SMA connectors for RF power control. Back side is shown on figure 2

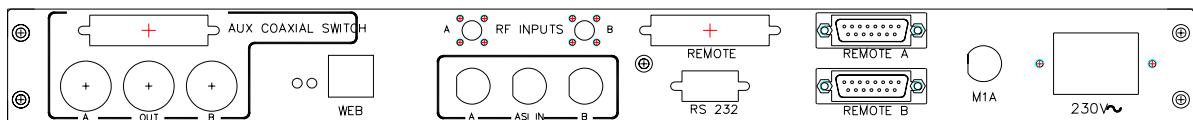


figure 2

2.1.3D-sub connectors

2.1.3.1Remote A

This connector is a standard D-sub 15-pol male connector. On individual pins, the following signals will be present:

K10/1,9	(Interlock): Short-circuited connection 'interlock', applied to selected device (relay contact)
K10/2	(Inhibit 2 in): Inhibit input 2
K10/3	(Inhibit 1 in): Inhibit input 1
K10/4	(Common): Common terminal for ON/OFF commands
K10/5	(12V): 12 V supply during changeover (output)
K10/6	(12V): 12 V supply (output)
K10/7	(24V): 24 V supply (output)
K10/10	(off A): Turn off device A (relay contact to common)
K10/11	(on A): Turn on device A (relay contact to common)
K10/12	(Inhibit 1 out) Inhibit output 1
K10/13	(Inhibit 2 out) Inhibit output 2
K10/8	GND ()

Other contacts are not used

2.1.3.2 Remote B

This connector is a standard D-sub 15-pol male connector. On individual pins, the following signals will be present:

K11/1,9 (Interlock): Short-circuited connection 'interlock', applied to selected device (relay contact)

K11/2 (Inhibit 2 in): Inhibit input 2

K11/3 (Inhibit 1 in): Inhibit input 1

K11/4 (Common): Common terminal for ON/OFF commands

K11/5 (24V): 24 V supply during changeover (output)

K11/6 (12V): 12 V supply (output)

K11/7 (24V): 24 V supply (output)

K11/10 (off B): Turn off device B (relay contact to common)

K11/11 (on B): Turn on device B (relay contact to common)

K11/12 (Inhibit 1 out) Inhibit output 1

K11/13 (Inhibit 2 out) Inhibit output 2

K11/8 GND ()

Other contacts are not used

2.1.3.3 Remote

This connector is a standard D-sub 25-pol male connector. On individual pins, the following signals will be present:

K6/1	(Select A) Switch to Device A (Command)
K6/14	(Select B) Switch to Device B (Command)
K6/2	(Select Auto): Select auto mode of operation (Command)
K6/15	(Select Manual): Select manual mode of operation (Command)
K6/5	(Auto): PAP-D operates Auto mode. (Signalisation)
K6/19	(Autoch): Changeover in auto mode occurred (Signalisation)
K6/20	(PAP-D is off): PAP-D is off (Signalisation)
K6/4	(Selected A): Device A selected. (Signalisation)
K6/17	(Selected B): Device B selected. (Signalisation)
K6/18	(Remote) PAP-D operates in remote mode (Signalisation)
K6/6	(Inhibit) Signals inhibit condition on PAP-D (Signalisation)
K6/13	(0VGL) Galvanic separated ground.
K6/25	(+U24GL) Galvanic separated voltage 24V.
K6/12	(GND) GND
K6/24	(+U24) 24V supply

Other contacts are not used in this application and are not to be connected!!

All commands are initiated by connecting external key to galvanic separated ground or ground for 200 to 500 ms. All signalisations connect pin with relay to galvanic separated ground or ground for duration of function.

2.1.3.4RS232

This connector is used for series RS232 communication. The following contacts are used:

K7/2 (RxD)

K7/3 (TxD)

K7/5 GND ()

Other contacts are not used.

2.1.3.5Auxiliary coaxial switch

This is standard 25 pole D-sub female connector used for connection with external coaxial relay. The following contacts are used:

K15/1&14 (24V supply) 24 V supply for external coaxial relay.

K15/15 (RF position 2) Command to switch relay to RF position 2. This is relay contact to GND.

K15/16 (RF position 1) Command to switch relay to RF position 1. This is relay contact to GND.

K15/5 (RF position 2 indication) RF position 2 selected.

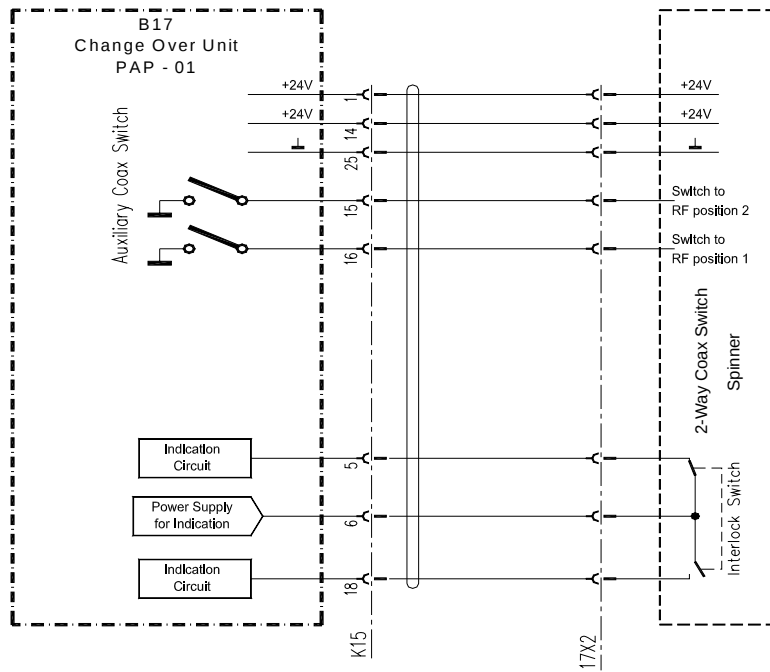
K15/6 (24V supply) 24 V supply for indication terminals.

K15/18 (RF position 1 indication) RF position 1 selected.

K15/25

(GND)

()



2.2 Description

Mains voltage 230V is led via RSO filter, varistor, fuse, on/off switch to the transformer TR1. The secondary part of the transformer comprises three, galvanic separated, a.c. voltages. A.c voltage of 36V/1,5A is led to a diode bridge GR3 and led to 28V connector via TR1 and to 24V connector via IC3.

A.c. voltage 20V/0.8A is led via the connector to a diode bridge GR2 and via IC2 to 12V connector.

A.c. voltage 12V/1A from transformer is led to diode bridge GR1 and to IC1 to 5V connector.

Green led diodes on PCB-MCU indicate presence of voltages 28V, 24V, 12V and 5V.

2.3 Troubleshooting hints

- When 28 V is not present (LED D3 on PCB-MCU is off): Check the fuse F1.
- When voltages 5V (LED D4 on PCB-MCU is off), 12V (LED D5 on PCB-MCU is off), 24V (LED D6 on PCB-MCU is off), check the circuitry on power supply PCB.

Maintenance:
Not required.

Technical Data

Input voltage:	230V +-15%, 50Hz, single phase (Option: 220V +-15%)
<u>Input current:</u>	<u>max. 0.5A</u>
Output voltage 1:	+28V
Output current 1:	max 0.3A
Output voltage 2:	+24V
<u>Output current 2:</u>	<u>max 1.5A</u>
Output voltage 3:	+12V
<u>Output current 3:</u>	<u>max 0.8A</u>
Output voltage 4:	+5V
<u>Output current 4:</u>	<u>max 0.8A</u>

2.4Peff probe

Peff probe tests RF power of monitored device and generates DC voltage, which is led to A/D converter via connector K6.

2.5Coaxial relays

2.5.1Internal coaxial switch (optional)

PAP-D is capable of controlling internal coaxial switch Teledyne CCS-32, which can handle up to 300W. For devices with higher output power external coaxial relay has to be used.

2.5.2External coaxial switches

Following external switches are supported by PAP-D:

- Spinner BN 51 26 01
- Spinner BN 51 26 90
- Spinner BN 51 26 95
- Spinner BN 94 19 12
- Spinner BN 94 19 15

2.6Operation

2.6.1Microcontroller

The microcontroller part of the changeover unit consists of two units. MCU is the central processor unit, whose task is to capture and process the data and to control the unit.

DISPLAY is the user interface used to modify settings and for showing unit status. In addition to the display, the right side also includes 5 LED diodes which provide prompt information about changeover unit status.

2.6.2 LED diodes

LOCAL/REMOTE

- o Yellow: LOCAL mode
- o Green: REMOTE mode

A

- o Device A connected to antenna if this LED is lit

AUTO/MANUAL

- o Green: Auto mode
- o Yellow: Manual mode

B

- o Device B connected to antenna if this LED is lit.

INHIBIT:

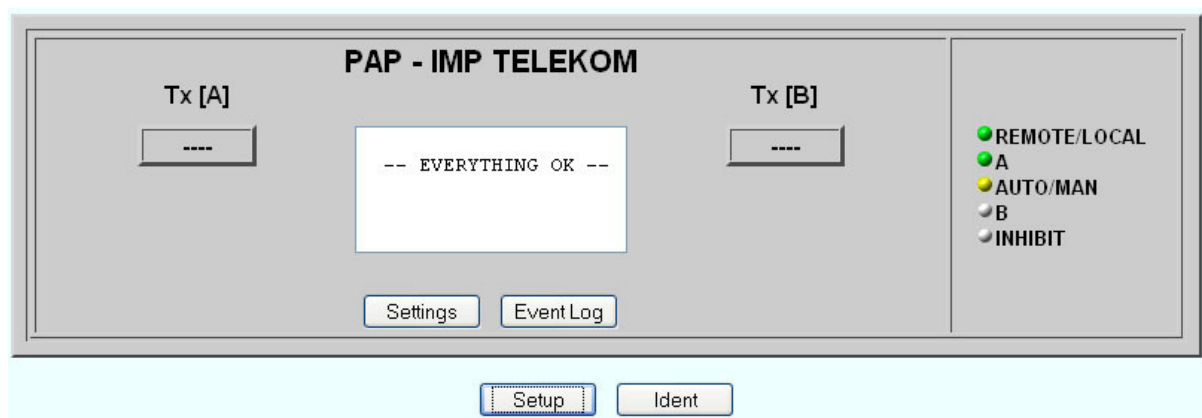
- o Changeover in AUTO mode is prohibited when this LED is lit.

LEDs A and B are blinking during changeover!

2.6.3 WEB/SNMP unit

WEB/SNMP unit enables control and monitoring over PAP via WEB page and SNMP V1 agent. WEB/SNMP config software is used for modifying parameters.

Main page shows power on both transmitters and status of PAP.



Some parameters are available on SNMP V1 agent.

The image shows a software interface titled "PAP Settings". It contains two dropdown menus: "Switch" set to "A" and "Mode" set to "Auto". Below these are two columns of controls for "Tx A" and "Tx B". Each column has three buttons: "Start", "Stop", and "Info". A central column of buttons includes "Update", "Reset", and "Info".

PAP Settings				
Switch	A ▼			
Mode	Auto ▼			
Tx A	Update	Tx B		
Start	Reset	Start		
Stop	Info	Stop		

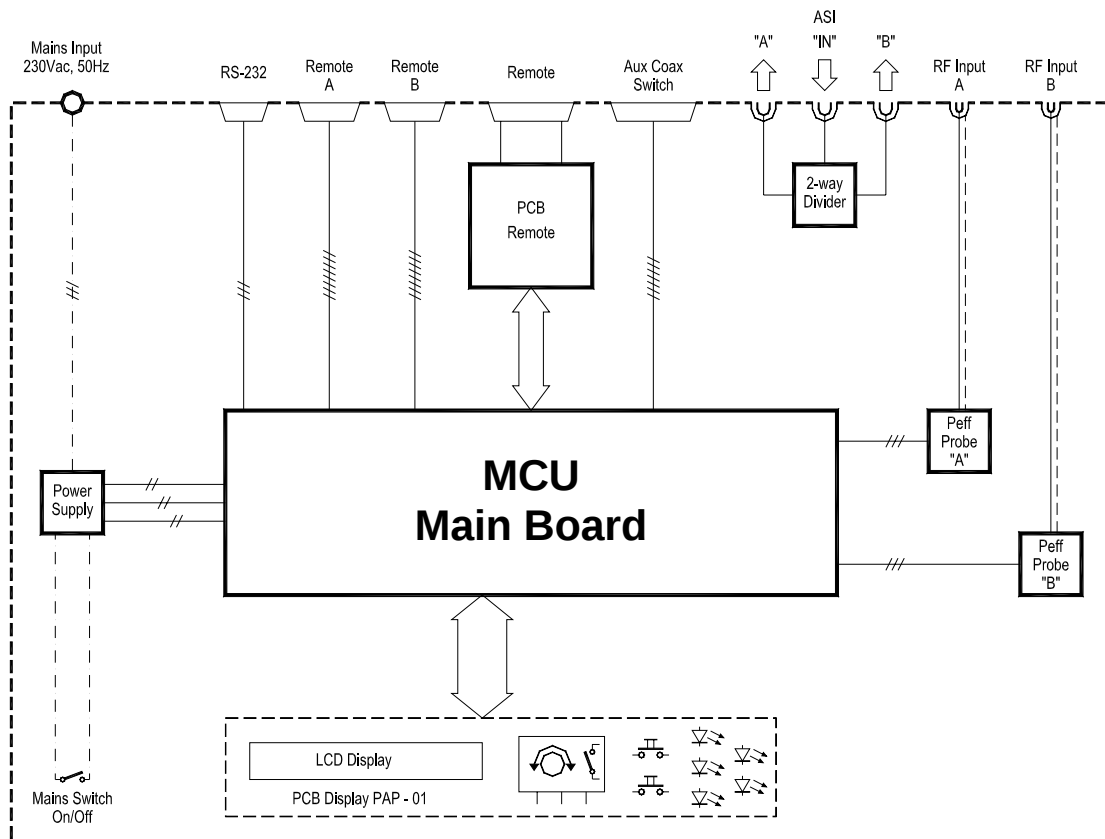
2.7 Start sequence

When PAP-D is started, presence and position of coaxial relay is checked. By position of the switch it is determined, which device is selected. RF level indication on PAP-D display is adjusted manually by the following procedure:

- Turn on device A and charge it with nominal power. Turn potentiometer Device A on the right side of PAP-D unit until RF power A showed on display is 0.0 dB
- Turn on device B and charge it with nominal power. Turn potentiometer Device B on the right side of PAP-D unit until RF power B showed on display is 0.0 dB.

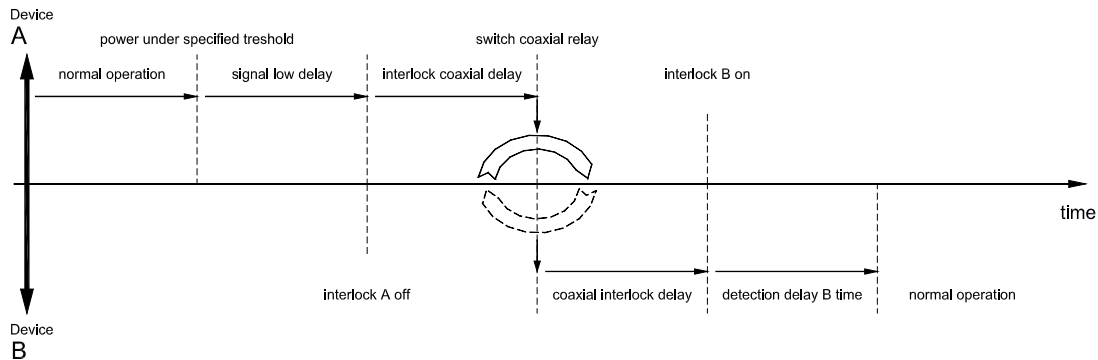
This step is has to be done when PAP-D is installed into system.

2.8 Block Scheme



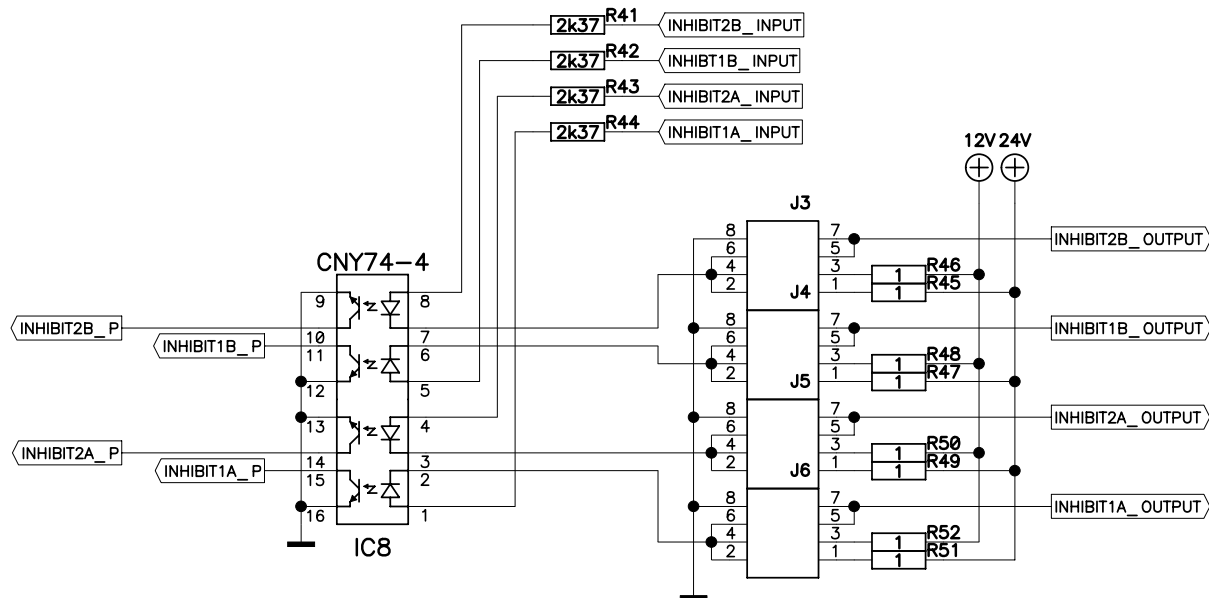
2.8.1 Switch sequence

This time diagram shows switch sequence from device A to device B.



2.8.2 Inhibit inputs

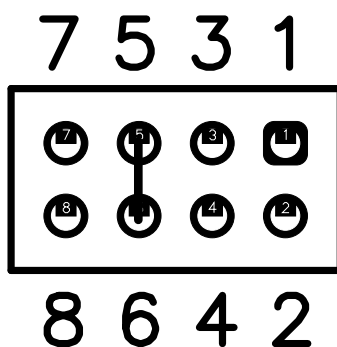
Inhibit inputs are used to prohibit changeover in automatic mode although other conditions (low power on main device) are reached.



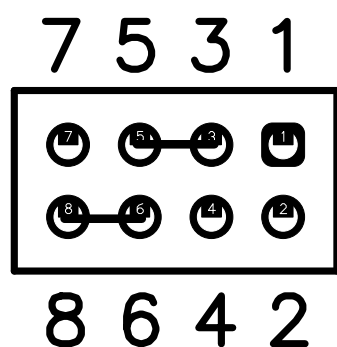
Position of links on jumpers J3, J4, J5 and J6 in order to reach inhibit condition:

6.

- o 12V from external source has to be applied to inhibit input. Inhibit output, which belongs to selected input, has to be connected to external GND.

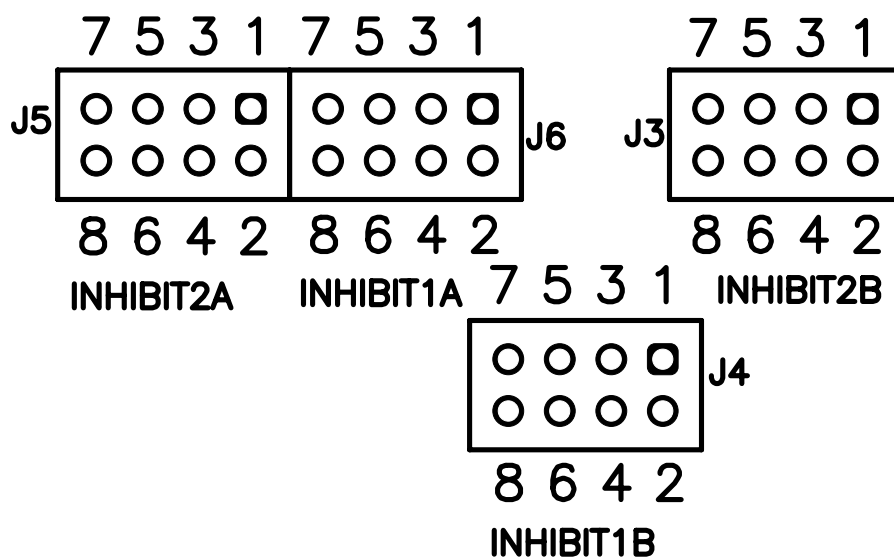


- o Shortcut between inhibit input and belonging output has to be done.



!!Other positions of links might cause permanent damage to PAP-D!!

Position and numbering of jumpers J3, J4, J5 and J6 on MCU board:



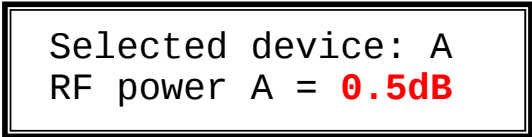
2.9 Description of menus

2.9.1 Basic display

Once the start sequence is over, the basic information appears on display. The top line shows the selected device and in the second line RF power in dB of selected device is displayed.

2.9.2 Main menu

To access this menu, press the encoder. This menu displays the submenus. To move between individual submenus, turn the encoder left or right. Individual menu is selected by pressing the encoder. To leave a submenu and select a higher level menu, select Exit and press the encoder. Shifts between menus and settings of all menus are shown graphically through drawings.



Selected device: A
RF power A = **0.5dB**

2.9.3 Comm access

Communication access is selected in this menu. In REMOTE mode other menus are not available.

- LOCAL: Remote control disabled
- REMOTE: Remote control enabled



=>1.Comm Access
2.Mode



Comm Access
<LOCAL> REMOTE

2.9.4 Mode

In this menu mode of operation is selected.

- In Manual mode devices can be selected with quick selection buttons and RF power detection is disabled.
- In Auto mode selection of devices is automatic and RF power detection is enabled.

=>2.Mode
3.TX ON/OFF setup

Mode
MANUAL <AUTO>

2.9.5TX ON/OFF setup

In this menu ON and OFF commands to transmitters can be generated.

- Device A: ON and OFF commands are generated to device A in manual mode and local command access.
- Device B: ON and OFF commands are generated to device B in manual mode and local command access.

```
=>1.Device A
    2.Device B
```

```
Device A
<ON>    OFF
```

```
=>2.Device B
    3.Exit
```

```
Device B
ON      <OFF>
```

2.9.6Event list

In this menu Event list is displayed. In the first menu level “view” and “clear” options are presented. When “clear” is applied, event list will be cleared. When “view” is selected, we can see last event. It is possible to scroll through event list by turning encoder wheel.

```
=>4.Event list
    5.RF level A
```

```
Event list
<VIEW>  CLEAR
```

```
163.M:Man ch A->B
14:10:27 06.10.09
```

```
EVENT LIST
IS EMPTY
```


2.9.7 RF level A

Press the encoder to access this sub menu, in which threshold level, when PAP-D switches from device A to device B, is modified. This level can be set from 0 dB to - 9 dB in 0.1 dB steps. To conform selected setting, press the encoder.

```
=>5.RF level A
   6.RF level B
```

```
RF level A: -3.0 dB
```

2.9.8 RF level B

Press the encoder to access this sub menu, in which threshold level, when PAP-D will switch from device B to device A, is modified. This level can be set from 0 dB to - 9 dB in 0.1 dB steps. To conform selected setting, press the encoder.

```
=>6.RF level B
   7.Num.of s.c
```

```
RF level B: -3.0 dB
```

2.9.9 Set number of switch cycles

In this sub-menu number of switch cycles is modified. This is important in case of failure of both devices and here it is set, how many cycles will be performed, before PAP-D will stop switching. Number of switch cycles can be set from 1 to 20. To conform selected setting, press the encoder.

```
=>7.Num.of s.c.
   8.condition int.
```

```
Num of s.c.
<SET>  CLEAR
```

```
Number of switch
cycles: 4
```

2.9.10Condition interval

In this menu selection and length of condition interval is modified. The first level is meant to switch on or off this function. In the second level number of days is modified. PAP-D performs condition changeover in selected time interval. Changeover occurs at date change (midnight). Number of days can be set from 10 to 30. To conform selected setting, press the encoder.

```
=>8.Condition int
  9.Sig low del
```

```
Condition interval
ON      <OFF>
```

```
Condition interval:
30 days
```

2.9.11Set signal low delay

In this sub menu delay from power fall to start of changeover cycle is modified. It can be set from 1 second to 60 seconds. If RF power is restored during this time, changeover is cancelled and PAP-D returns to normal operation.

```
=>9.Sig low del
 10.Advanced
```

```
Signal low delay:
10 s
```

2.9.12Advanced settings

In this menu advanced settings of PAP-D are accessed.

```
=>10.Advanced
 11.Time&Date
```

2.9.12.1 Web server

This is configuration for web-server option. IP address, filtering, username and password for web access can be set there. There are four settings with format xxx.yyy.www.zzz where xxx, yyy, www and zzz are numbers in the range from 0 to 255. First number is accessed by pressing encoder wheel. Value is set by turning encoder wheel. Every next number is accessed by pressing encoder wheel. When last number is set and encoder wheel is pressed, whole setting is accepted.

=>1.WEB SERVER
2.INTLCK/COAXIAL

IP Addr

This is IP address of the web server. This number can be typed in the web browser to access site with the transmitter parameters.

1.IP Address
=>**192.168.3.105**

IP Address set
192.>168.3.105

Sub Msk

This is subnet mask and with combination of IP address identifies which network segment is transmitter on. Typically default subnet mask use either 0 or 255 as values (such as 255.255.255.0), but other number values can appear.

2.Subnet mask
=>**255.255.255.0**

Subnet mask set
255.>255.255.0

Gateway

This is address of gateway. It is a router that connects two separate network segments (for example local network and internet).

3.Gateway
=>**192.168.3.254**

Gateway set
192.>168.3.1

IP Filt

If this number is 0.0.0.0 any client (computer) can access transmitter web page otherwise only computer with same IP as this number can access web page.

1.IP Filter
=>**0.0.0.0**

IP Filer set
0.>0.0.0

User

When the transmitter web-page is accessed, username and password are required. This is username for accessing page. User can not be modified in this menu

=>5.View user
IMP

Pass

This is password for accessing the transmitter web-page. Password can not be modified in this menu

=>5.View pass
1234

2.9.12.2INTLCK/COAXIAL delay

In this menu delay from taking away interlock connection on device with low power or shutting down that device to beginning of coaxial switch operation is modified. It can be set from 100 ms to 5 s in 0.1 s steps.

=>1.INTLCK/COAXIAL
2.COAXIAL/INTLCK

Interlock/coaxial
delay: **2000 ms**

2.9.12.3COAXIAL/INTLCK delay

In this menu delay from the end of coaxial relay operation to applying interlock connection to device in reserve or switching on that device is modified. It can be set from 100 ms to 5 s in 0.1 s steps.

=>2.COAXIAL/INTLCK
3.Detect start A

Coaxial/interlock
delay: **2000 ms**

2.9.12.4 Set detection start delay A

In this menu delay from the end of switch to detection start on device A is modified. It can be set from 1 to 240 s.

=>3.Detect start A
4.Detect start B

Detection delay A:
20 s

2.9.12.5 Set detection start delay B

In this menu delay from the end of switch to detection start on device B is modified. It can be set from 1 to 240 s.

=>4.Detect start B
5.RF protection

Detection delay B:
20 s

2.9.12.6 RF protection

Before switching coaxial relay RF power on devices A and B is measured. If there is RF power present on one of those devices, PAP-D will not switch relay. This protection can be switched ON or OFF in this menu.

=>5.RF protection
6.TX ON/OFF type

RF protection
<ON> OFF

2.9.12.7Tx ON/OFF type

Pulse or constant signal switch ON/OFF commands can be issued by PAP-D to controlled devices on connectors Remote A and Remote B. Type of command can be selected separately for each device. Commands are issued according to IEC 964-1 standard. Commands are galvanic separated from internal PAP-D circuit. Bistable relay for “ON” command ensures continuity of operation, when constant signal is required. Schematics of ON/OFF commands is shown on **Napaka! Vira sklicevanja ni bilo mogoče najti.**

=>6.Tx ON/OFF type
7.Reset to def.

=>Device A
Device B

Device A:
CONST **<PULSE>**

Device B:
CONST **<PULSE>**

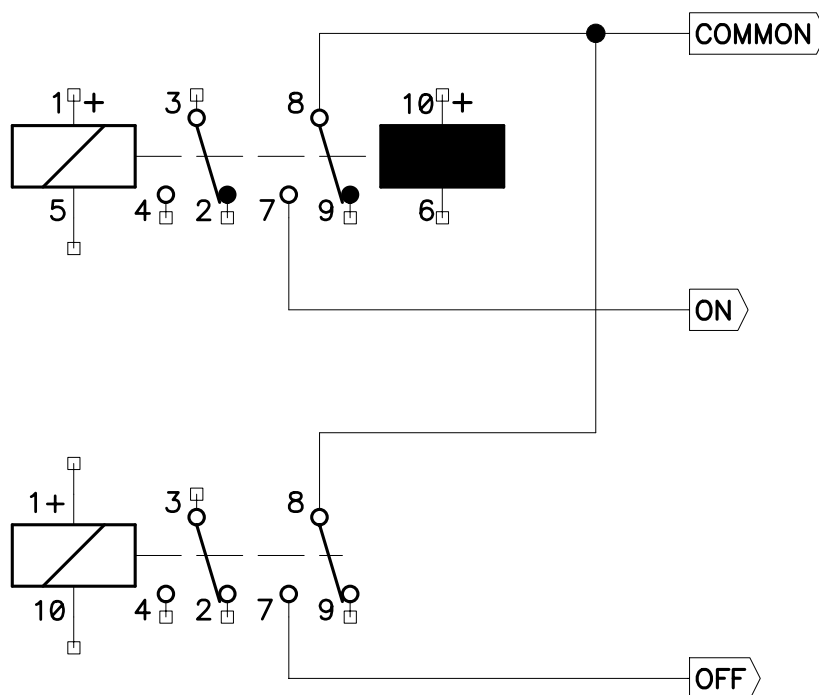


Figure 3

2.9.12.8 Inhibit setup

Inhibit condition can be initiated from many different sources. In this menu there can be selected, which condition on inhibit input stands for inhibit. It can be selected for each input separately.

Inhibit init conditions:

TRUE: Inhibit output is connected to belonging input.

FALSE: Inhibit output is not connected to belonging input.

Inhibit 1A and Inhibit 1B can be in AND or OR relations.

Inhibit 2A and Inhibit 2B can be in AND or OR relations.

AND: Suitable condition on both outputs is demanded to initiate inhibit condition.

OR: Suitable conditions on any of both outputs initiates inhibit condition.

=>7.INHIBIT setup
8.Reset to def.

=>Inhibit 1A
Inhibit 2A

Inhibit 1A
<TRUE> FALSE

=>7.INHIBIT setup
8.Reset to def.

=>Inhibit 1A
Inhibit 2A

Inhibit 2A
TRUE <FALSE>

```
=>7.INHIBIT setup
8.Reset to def.
```

```
=>Inhibit 1B
Inhibit 2B
```

```
Inhibit 1B
<TRUE> FALSE
```

```
=>7.INHIBIT setup
8.Reset to def.
```

```
=>Inhibit 1B
Inhibit 2B
```

```
Inhibit 2B
<TRUE> FALSE
```

Inhibit mode

ALL: Inhibit condition can be initiated by both devices.

A/B: If device A is connected to antenna, only device B can initiate inhibit condition and if device B is connected to antenna, only device A can initiate inhibit condition.

```
=>6.INHIBIT 1 logic
7.INHIBIT mode
```

```
Inhibit 1 logic
DISABLED
```

```
Inhibit 2 logic
DISABLED
```


Inhibit mode
ALL <A/B>

2.9.12.9 Reset to defaults

Factory settings are loaded in this menu.

=>8.Reset to def.
9.Exit menu

Default settings
loaded

2.9.12.10 Exit menu

Return to main menu.

8.Reset to def.
=>9.Exit menu

2.9.13 Time&Date

Time and Date of RTC can be set here. Modified parameter is selected by pressing encoder wheel and marked with “>” sign.

```
=>11.Time&Date
  12.PAP-D Status
```

```
T: 10: 30: 22
D: 07. 10. 2009
```

```
T:>10: 30: 22
D: 07. 10. 2009
```

```
T: 10:>30: 22
D: 07. 10. 2009
```

2.9.14 PAP-D Info

In this menu all settings of PAP-D can be monitored. Turn the encoder until “Exit” appears on display in order to return to main menu.

```
=>12.PAP-D Info
  13.Exit menu
```

```
RF protection: ON
=>Exit
```

2.9.15 Exit menu

Return to basic display.

```
12.PAP-D Status
=>13.Exit menu
```

2.10 Message List

“Switching from A to B” Changeover unit is in switch over process switching from device A to device B.

“Switching from B to A” Changeover unit is in switch over process switching from device B to device A.

“ERROR!! RF power present!” Despite interlock connection break some devices might not power down and it's RF power is still present, PAP-D waits for RF power to fall and switch to another device. If RF power remains for another 15 s, PAP-D switches back to previous device.

“Low power on A” RF power under specified threshold selected in menu RF level A was detected on device A

“Low power on B” RF power under specified threshold selected in menu RF level B was detected on device B

“COAX SWITCH ERROR!!” Connection to external switch failed or external switch error.

“INHIBIT ALL!!” Changeover in Auto mode is not permitted. (Inhibit mode selected: ALL)

“INHIBIT A!!” Changeover from B to A in Auto mode is not permitted. (Inhibit mode selected: A/B)

“INHIBIT B!!” Changeover from A to B in Auto mode is not permitted. (Inhibit mode selected: A/B)

2.11 Event list messages

2.11.1 Faults

- F: Auto ch A->B Automatic changeover from A to B
- F: Auto ch B->A Automatic changeover from B to A
- F: Coax error Coaxial switch error

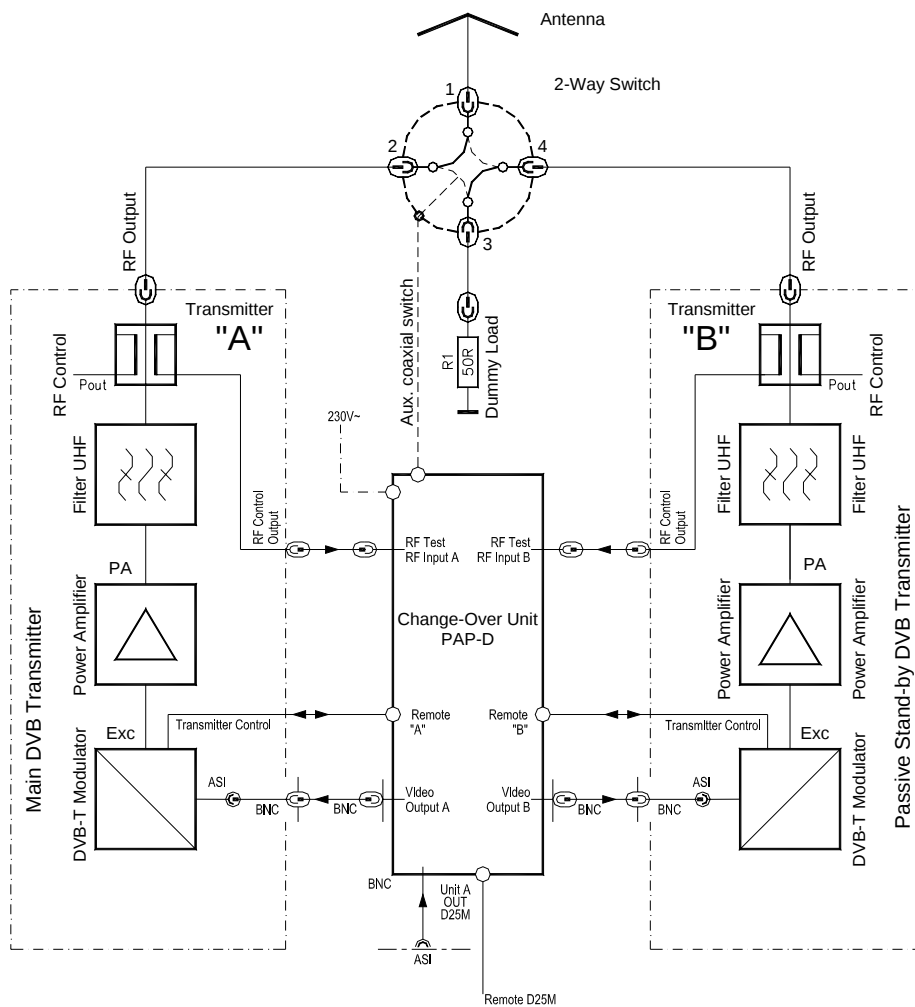
2.11.2 Warnings

- W: Low P on A Low power on device A
- W: Low P on B Low power on device B
- W: Inhibit Inhibit condition

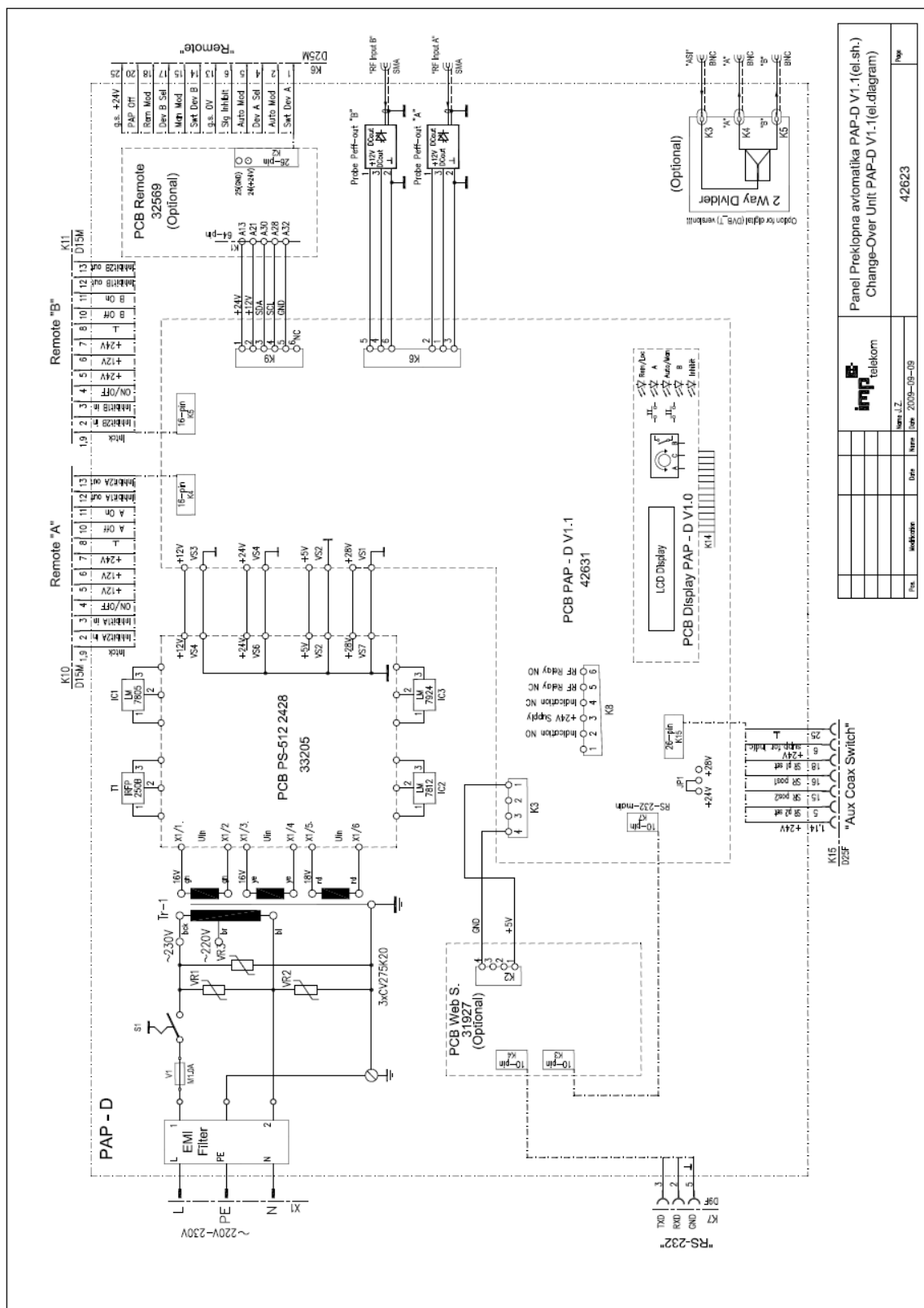
2.11.3 Messages

- M: Inhibit cl inhibit clear
- M: Man ch A->B Manual changeover from A to B
- M: Man ch B->A Manual changeover from B to A
- M: Auto mode Switch to Auto mode
- M: Manual mode Switch to Manual mode
- M: Coax OK Coax switch connection OK
- M: Cond ch A->B Condition changeover from A to B
- M: Cond ch B->A Condition changeover from B to A
- M: Rem swon A Remote switch on device A
- M: Rem swoff A Remote switch off device A
- M: Rem swon B Remote switch on device B
- M: Rem swoff B Remote switch off device B

2.12 DVB-T transmitters and PAP-D



2. Electrical diagram



COMPONENT LIST:

- SPK54-10VZ/AV: — ZAD ST. K10 (REMOTE A)
- TES PAP-D K5: — ZAD ST. K11 (REMOTE B)
- TES PAP-D K15: — ZAD ST. K16 (AUX)
- TES PAP-D K62: — SONDA Pw/B1
- TES PAP-D K63: — SONDA Pw/B2
- TES PAP-D K64: — SONDA Pw/A3
- TES PAP-D K65: — SONDA Pw/A4
- TES PAP-D K66: — SONDA Pw/A2
- TES PAP-D VS3+12V: — TES NAP-PS VS4+12V
- TES PAP-D VS3+GND: — TES NAP-PS VS4GND
- TES PAP-D VS3+12V: — TES NAP-PS VS4GND
- TES PAP-D VS4+GND: — TES NAP-PS VS4GND
- TES PAP-D VS2+5V: — TES NAP-PS VS2+5V
- TES PAP-D VS2+GND: — TES NAP-PS VS2GND
- TES PAP-D VS2+5V: — TES NAP-PS VS2GND
- TES PAP-D VS1+GND: — TES NAP-PS VS1GND
- TES PAP-D VS1+GND: — TES NAP-PS VS1GND
- TES PAP-D K31(1+2V): — TES REMOTE K1A21
- TES PAP-D K32(12V): — TES REMOTE K1A30
- TES PAP-D K32(12V): — TES REMOTE K1A28
- TES PAP-D K34(GND): — TES REMOTE K1A22
- TES REMOTE K2: — ZAD ST. K6 (REMOTE)
- TES WEB S. K3(4+5V): — TES PAP-D K31(4+5V)
- TES WEB S. K21(GND): — TES PAP-D K34(GND)
- TES WEB S. K3: — TES PAP-D K7(RS232)
- TES WEB S. K4: — ZAD ST. K7 (RS232)

4. Bill of material

	Designation:	Stock No.	Page:		File:	
	PANEL CHANGEOVER AUTOMATIC	42623	Date:	9.9.2009	Disk:	
	<i>PAP-D V1.1</i>					

[illegible]

7. Attachment

DECLARATION OF CONFORMITY

Ljubljana, 04.09.2008

[Signature]

7.2 SAFETY PRECAUTIONS

IMP TELEKOM company's equipment (TV transmitter/transposer) has been designed and manufactured into due consideration the personnel Safety requirements as specified by IEC 215 Standard and Safety at Work Law (Slovenian Official Paper Nr. 47/88).

The installation, operation, maintenance and service of this equipment involves risks both to personnel and equipment, and must be performed only by qualified personnel exercising due care. IMP TELEKOM shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks.

The following are general safety precautions that are not related to any specific procedure and therefore do not appear elsewhere in this manual. These are recommended precautions that personnel must understand and apply during many phases of operation and maintenance.

① PERSONNEL MUST AT ALL TIMES OBSERVE SAFETY WARNINGS, INSTRUCTIONS AND REGULATIONS

② ALWAYS DISCONNECT POWER BEFORE OPENING COVERS, DOORS, ENCLOSURES, PANELS OR SHIELDS AND DISCHARGE AND GROUND A CIRCUIT BEFORE TOUCHING IT

③ KEEP AWAY FROM LIVE CIRCUIT

④ DO NOT ADJUST OR SERVICE ALONE

⑤ IN CASE OF EMERGENCY ENSURE THAT POWER HAS BEEN DISCONNECTED

ELECTRIC SHOCK

Factors affecting electric shock consequence are:

- amount of current flown through human body
- current path through human body
- contact duration

Rescue:

In case of electric shock, turn off the high voltage at once and ground circuits. If the high voltage cannot be turned off without delay, free the victim from the contact with the live conductor as promptly as possible. Avoid direct contact with either the live conductor or the victim's body. An axe with a dry wooden handle may be used to cut the high voltage wire. Use extreme caution to avoid the resulting electric flash.

Resuscitation:

Personnel working with or near high voltage should be familiar with modern methods of resuscitation.

NON – IONISING RADIATION: MICROWAVE AND RADIO FREQUENCY

In normal operation in accordance with the instructions provided in the service manual, no hazard will exist if the equipment and its accessories have been installed correctly and are functioning properly.

Ensure all input and output RF connections, flanges and coupling are correctly installed and are leakproof.

Unless connected to an antenna, never operate the transmitter/transposer without an RF energy absorbing load attached.

BERYLLIUM

RF power transistors, RF loads could be manufactured partly from a beryllium compound (Beryllium Oxide). Normally these can be handled without risk of toxicity, but there is a toxic hazard if dust or finely-divided particles of the material are inhaled or enter the body through a cut. Consequently, great care must be taken and hands must be washed after handling. If beryllium dust does enter the skin through a cut or abrasion, the affected area must be washed thoroughly and treated by a doctor.

Disposal

Disposal of faulty components must be carried out according to special arrangements. Should a component containing beryllium be broken, its parts and particles must be gathered carefully using a moistened tissue (wearing plastic or rubber gloves), placed in a plastic bag together with any contaminated materials, sealed, labelled and disposed of in a manner approved of by the Safety Authority.

7.3 RoHS/WEEE compliance

RoHS / WEEE Compliance Statement

Supplier: **IMP TEN-TELEKOM d.o.o.**
Address: **Vojkova cesta 58**
1000 Ljubljana
Slovenija

We declare under our sole responsibility that the IMP Ten-Telekom products are in compliance with EU Directive 2002/95/EC (RoHS) and EU Directive 2002/96/EC (WEEE).

RoHS Directive (2002/95/EC):

The Restriction of Hazardous Substances in Electrical and Electronic (RoHS) Directive was passed into law by the European Union (E.U.). It affects manufacturers, sellers, distributors and recyclers of electrical and electronic equipment containing lead, cadmium, mercury, hexavalent chrome, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE).

IMP Ten-Telekom equipment that complies with the EU directive is marked with a RoHS compliant emblem:



WEEE Directive – Waste from Electrical and Electronic Equipment:

The Directive aims to reduce the waste arising from electrical and electronic equipment, and improve the environmental performance of everything involved in the life cycle of electrical and electronic equipment.

IMP Ten-Telekom equipment that complies with the WEEE directive is marked with a WEEE – compliant emblem:



Name and signature:

Corporative Director
Vladimir Palčec

Place and date of issue:

Ljubljana, 5.10.2008



7.4 Measure Protocol